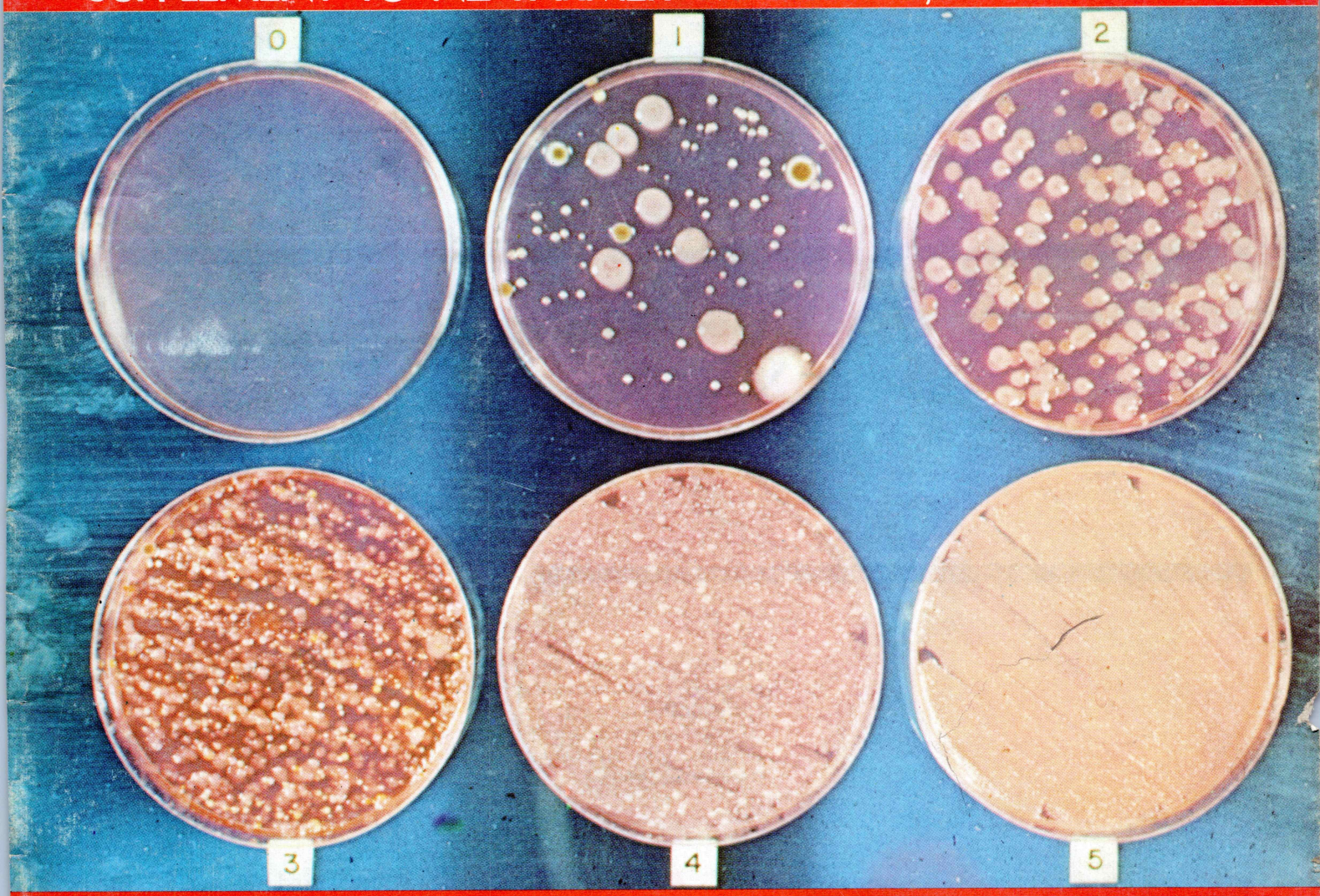
THE NEW ZEALAND
FARMER

GUIDE TO MILK QUALITY

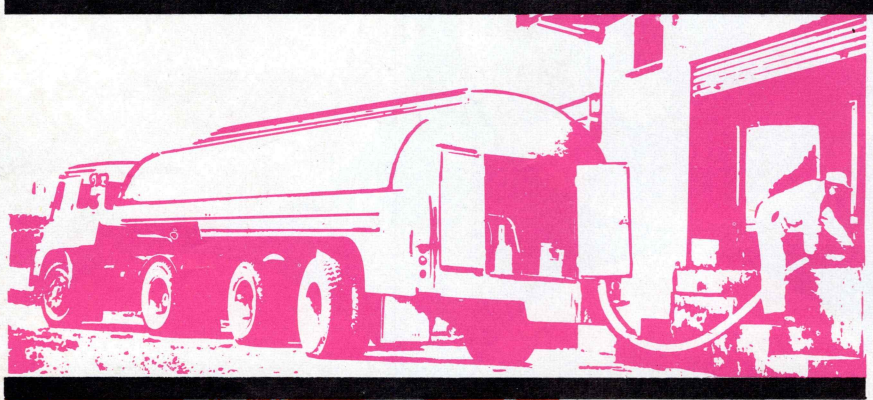
SUPPLEMENT TO NZ FARMER · MARCH 28, 1974



Which of these milk contact surfaces is like yours ?

These three germicidal cleansers from CIBA-GEIGY pack all the power you need to sanitise your shed and plant, clean and protect your herd's udders at milking time.

THE BIG THREE FOR DAIRY SHED HYGIENE



IOSENE

Cleanses and sanitises dairy shed equipment, milking machines, sheds and yards.
Iosene has its own built-in activity indicator. Once the solution becomes colourless the sanitising activity has ceased and the solution needs topping up with extra Iosene. You can *see* you're safe with Iosene.

DYNE 40

Is a 40% acid low-foaming detergent/ germicide recommended for cleansing and sanitising farm vats.
Just rinse the vat with clean water and fill with a solution of Dyne 40 until it is needed again.

IOSENE TEAT DIP

After each cow has been milked, dip or spray the teats with Iosene Teat Dip.
This cleanses the skin of mastitis—forming organisms . . . and softens and conditions teats to reduce the likelihood of infections from cuts and sores.

Improve dairy shed hygiene with CIBA-GEIGY products.

Manufactured and distributed by

CIBA—GEIGY

P.O. Box 2103, Wellington

Registered Trade Mark of CIBA-GEIGY Ltd, Basle, Switzerland.

Available from your nearest dairy company, or merchant supplier.

NZ FARMER

GUIDE TO MILK QUALITY

Somebody once said that the improvement of milk quality is only obtained by the application of the world's shortest commodity — common sense.

How true. It's common sense that a liquid such as milk, bacteria laden to start with, will accumulate more and more bacteria as it is pumped through a network of rubber tubing and stainless steel pipes towards a holding vat.

It's common sense that if this is done twice a day for months on end the milk-contacting surfaces will accumulate a bacteria-laden deposit contributing an ever-increasing amount of bacteria to the passing milk — UNLESS the surfaces are regularly and thoroughly cleaned.

And it's equally common sense that even if this milk has a minimal bacteria content when it arrives at a holding vat, the bacteria it contains are bound to multiply — UNLESS their rate of multiplication is inhibited by refrigerating the vat and keeping it clean.

And that's milk quality in a nutshell. If the tanker is to take away top-quality milk for processing, all milk-contacting surfaces must be kept scrupulously clean and the milk awaiting collection must be kept cool. Without both cleaning and cooling, top-quality milk cannot really be produced.

It doesn't always follow that the most modern sheds with the most modern milking plants will produce milk of the best quality. Researchers have found that a high percentage of those suppliers turning out top-quality milk have old tinned-brass plants.

It is attention to detail that is important if grades are to be avoided —detail in both design and layout of plant and detailed attention to milking and cleaning procedure. One recycling valve with copper in it can bring the most modern rotary back to the milk quality level of the most ancient walkthrough.

In this booklet we have attempted to provide guidelines which give the dairy farmer a better chance of producing milk of high quality.

The quality of milk at the farm gate has improved quite dramatically in recent years due mainly to the adoption nationwide of a more severe milk quality test. We are told that our milk leads the world now in quality. But only by paying strict attention to the sort of procedures outlined in this booklet will it continue to do so.

CONTENTS

COVER

The micro-photographs shown on the cover, supplied by the MAF's Waikato Dairy Laboratory, show the standards that have been set for grading the degree of contamination present on milk-contact surfaces in pipes, vats, etc. It's called the "Status Grading System" and each picture shows a "status" or standard of cleanliness, graded from 0 tc 5.

ACKNOWLEDGEMENTS

This booklet was written by the NZ FARMER feature writer, Bruce Gooding, BAgSc, with the exception of a revised contribution on bacterial milk quality originally written for the FARMER by Mr Alan Twomey, of Ruakura. Bruce Gooding would like to acknowledge assistance he had from the Director of the Waikato Dairy Laboratory, MAF, Ruakura, Hamilton, Alan Twomey, and his staff.

disappointed with your present fertilizer programme?

WHY USE LIQUIPHOS?

- Liquiphos is 100% soluble and has a 'double action' which feeds through the plant foliage and through the top soil.
- Liquiphos is not subject to waste through Fixation, Leaching or Surface run-off.
- The patented retention factor in Liquiphos ensures a progressive supply of nutrients for long term plant growth.
- Liquiphos promotes healthy root structure and soil bacteria — both essential for maximum results.
- Liquiphos is a chemical formulation which is neutral, not an acid.
- There is no pollution with Liquiphos.
- Liquiphos is registered as a fertiliser with the Department of Agriculture and qualifies for the Government Freight and Fertilizer subsidy.
- Prices are approved by the Price Tribunal.

Liquiphos is compatible with most weedicides, fungicides and insecticides. Liquiphos therefore eliminates the need for two applications.

THEN TRY LIQUIPHOS LIQUID FERTILIZER

A Farmers Industries Representative will conduct a free pH test on your soil and recommend the best Liquiphos formulation to meet your needs. There are 3 Liquiphos N.P.K. combinations to suit varying soil conditions, plus a special Liquiphos 15% Sulphur Concentrate mixture. All Liquiphos combinations can be mixed with weedkiller and applied with conventional spray equipment.

3 LIQUIPHOS NPK COMBINATIONS

LIQUIPHOS 10.3.5.
LIQUIPHOS 8.5.8.
LIQUIPHOS 0.7.12.

Liquiphos is available in quantities to suit any application . . . from 6oz packs to 45gal drums and bulk deliveries.

INCREASE THE RESULTS FROM YOUR FERTILIZER PROGRAMME WITH — LIQUIPHOS LIQUID FERTILIZER

Liquiphos
Registered trademark

N.Z. Patent No. 153269

Manufactured and marketed by:
FARMERS INDUSTRIES LTD.
P.O. Box 244, Taupo Quay, Wanganui.

to: Farmers Industries Ltd., P.O. Box 244, Wanganui.
Please send me your brochure on Liquiphos Liquid Fertilizer.

Name.....

Address.....

.....

74/F1/3 Phone.....

Setting higher standards

While the volume of dairy production itself has remained quite static in recent years, staggering gains have been made in milk quality. A short five years ago the standard of dairy produce being exported was, according to one expert, "reliably mediocre" in quality.

It took a research scientist from Ruakura and an outward-looking dairy company in the Bay of Plenty to demonstrate to the industry just how mediocre existing standards of quality were.

While the scientist, Mr Alan Twomey, was busy demonstrating that the then-used test for milk quality, the methylene blue test, could not be used to detect truly finest-grade milk, the company, the Rangitaiki Plains Dairy Company, at Edgecumbe, had launched a far-sighted programme (later to be called "Project Premium") which aimed at the production of top-quality raw milk on the farm so that top-quality products could be manufactured in the factory.

Having decided that the methylene blue test was inadequate as a measure of milk quality, Alan Twomey resurrected another test, the nitrate reductase test, which had been developed almost 50 years ago and had been discarded as ineffective.

He strengthened it — incubating at 30 deg C instead of 37 deg C — and then arranged with RPD to try it out. The initial trial involved 5000 samples of suppliers' milk. The samples were subjected to the methylene blue test as well as to the nitrate reductase test.

Under the methylene blue test, 97% of the samples graded finest. The nitrate reductase test, however, eliminated 86% of these as being below the required standard.

The standard set was: A total plate count of under 50,000 colonies per ml at 72 hours at 30 deg C; a coliform count of under 100 colonies per ml at 24 hours at 30 deg C. All samples were also required to be totally free of antibiotic, traces of detergent, pesticides, added water, sediment and colostrum.

When the results were compared with plate counts, it was found that the two tests revealed 95% of all samples that were not satisfactory.

Having sorted out a really stringent test, the RPD directors then called a meeting of suppliers — they had been kept informed about all moves in the preceding months — and put to them the proposal that all should use an improved system of plant cleaning, that milk be held on the farm in refrigerated vats and that the combined methylene blue and nitrate reductase test be used to assess the quality of all milk received. A 2c premium would be paid for milk reaching the stringent "finest" standard. This was "Project Premium."

Results were very encouraging. In 1969/70 the first season, 70.917% of milk graded premium under the new, stricter tests. In 1970/71 the figure was 83.106%. In 1971/72 a further step up was made to 84.829%.

The count of thermoduric (heat-resistant) bacteria posed some problems, so in 1971/72 a specific test for thermodurics was brought in. Milk with a thermoduric count of above 5000 was penalized 2c a pound.

During the 1970/71 season other dairy companies adopted the nitrate test on a trial basis, all having considerable success. In late 1970 it was announced that from the start of the 1971/72 season both tests — the nitrate reductase test and the modified methylene blue test — would be compulsory throughout the country.

COMMUNICATION . . .

Since the Rangitaiki Plains Dairy Company made its move towards improving milk quality many other companies have (without the same amount of publicity) adopted similar schemes with the same object in mind.

Not all schemes involve payment of a premium for quality milk, yet all have been successful. Indeed, it is not true to say that the application of a premium alone by a company would result in milk of the required standard being produced.

The premium helps a lot, of course, but equally important is the launching of a comprehensive educational programme aimed at bringing all involved in the company — from supplier to tanker driver to factory staff — right in touch with what is going on.

Rangitaiki had to go one step further initially: It had to institute a more severe test since most of its suppliers were having little difficulty in grading "finest" under the existing methylene blue test.

But since a more stringent test has now been adopted universally, the only requirements for a quality scheme to be successful are a well-planned educational programme (essentially) and the payment of a premium for quality (preferably).

Alan Twomey explains the importance of good communication in any quality scheme: "I believe that if a feed-back system is established between the test result and what a farmer does to achieve a higher standard, and this is coupled to a good education programme, enlightened farm dairy instruction and good technical resources at the dairy company, the road to improved milk quality is smooth.

"It only becomes difficult to achieve milk quality when these systems fail to communicate the objectives of the milk-quality programme, the methods adopted and the methods which are to be used by the farmer in achieving the goal."

Technical back-up

It's been shown that it's not enough for a company to merely conduct tests and then inform suppliers that milk is not up to standard. An efficient technical back-up service is needed otherwise a project could founder even if a premium is offered.

Communications media that have been used successfully by companies launching quality schemes are newsletters (first and foremost), Press and radio, and meetings of suppliers. At the latter gatherings, all must be given the opportunity and must feel free to criticise and ask questions.

Such communication must continue once the scheme is under way. Company staff must be ready and willing to advise a supplier why he is not achieving premium. This will usually entail a farm visit, so enough staff must be on hand to provide this service.

Suppliers and factory hygiene and extension officers are not the only groups from which effort is required to meet a milk quality goal. Hygiene at the factory must be improved to such a standard that the premium milk obtained from suppliers can be processed into products of premium quality.

In short, a true team effort is needed if a company is to supply products that will satisfy those most discriminating overseas markets.

PRODUCING HIGH-QUALITY MILK

The first portion of this section was contributed by Waikato Dairy Laboratory superintendent Mr Alan Twomey to the FARMER's 1970 "Dairy Hygiene" booklet. It is reprinted here, since its relevance remains unchanged

It is important to understand the nature of the thin deposit which is left on every part of the milking plant that has been contacted by passing milk.

This deposit consists of two parts: A part that is soluble in alkaline conditions, consisting of the milk fat and some of the milk protein; and a second part which is acid-soluble and which consists of protein and mineral.

This second part will be very familiar to those who use only alkaline cleansers or caustic soda, for it is the hard milkstone that results from such cleaning systems.

This deposit is the major source of thermoduric bacteria. It is the aim of cleaning to provide, in the system, both acid and alkaline materials, used as separate solutions, to remove all parts of milk deposits from the machine surfaces.

Immediately after milking, rinse the plant with a large volume of good quality cold water. This step is one of the most important in any cleaning system. The aim should be three gallons to a set of cups.

The additions of a non-ionic wetting agent to this rinse water will give considerable improvement to the efficiency of rinsing.

Before rinsing, the milk delivery pipe to the vat should be disconnected because, apart from the legality of adding water to milk, if the rinse water contains large numbers of bacteria they may destroy all efforts gained by having a clean machine.

The best water for rinsing, or for any cleaning operation, is rain water and it is surprising that greater efforts at collecting rain water are not made by farmers.

After rinsing, the plant should be cleaned with an alkaline detergent (not caustic soda and wetting agent). The detergent should be used at lower than 71 deg C, not boiling.

If the water is hard it is suggested that a slightly higher concentration of detergent be

CLEANING SCHEDULE RECOMMENDED FOR RANGITAIKI PLAINS SUPPLIERS BY THE COMPANY AS PART OF "PROJECT PREMIUM."

A. BEFORE MILKING

SANITIZING
¼ oz to a gal
½ gal per set of cups

Before milking rinse the plant with standard iodophor. Allow for contact time. 10 MINUTES. When milking commences, take care that initial milk entering vat is free of iodophor solution.

B. AFTER MILKING

(1) PRE-RINSE
¾ oz to 2 gal

Flush plant with cold water, the more the better, but not less than 2 GAL PER SET OF CUPS, followed by — 1 GAL of COLD WATER PER SET OF CUPS WITH A NON-IONIC WETTING AGENT.

(2) DETERGENT-WASH
¼ oz to a gal

Flush each set of cups with 1 GAL OF ALKALINE DETERGENT (NOT CAUSTIC) AT 160 deg. F.

(3) FINAL RINSE

Finally rinse the milking plant with hot water direct from cylinder. 1 GAL PER SET OF CUPS.

used. If the detergent is used too hot it will cause milk proteins to become "cooked" on to the machine surfaces and increase the difficulty of removal by the acid cleanser

Where flush cleaning is used on large plants it is necessary to have several sets of cups being cleaned at once so that detergent will reach all points on the milk line and the releaser or the receiving tank.

Many releasers should be taken down and cleaned separately after machine cleaning.

If the machine is cleaned by the recirculation method, several points should be kept in mind. The first few gallons which come through the plant should be run to waste as the temperature will be too low. Cleaning should be stopped when the detergent temperature has reached 49 deg C, as removed soil may redeposit, below this temperature.

No more than eight units should be circulated at any one time and, if possible, the pulsators to the units not circulating should be switched off.

After cleaning, the machine should be flushed with hot water to remove detergent residues and kill bacteria in the machine surfaces and joints. The machine should then be opened to dry out as bacteria do not grow so well on dry surfaces.

If a bar cooler is used it should be washed by hand, making sure that both sides are cleaned. The introduction of plate coolers has made cooler cleaning somewhat easier, as these coolers are readily cleaned by the pumping of detergents through them by the milk-lift pump.

Many farmers have found it necessary to prepare extra detergent for cleaning the milk-lift pump, plate cooler and delivery line.

Before next milking

After the previous milking the machine was cleaned with alkaline detergent and rinsed with hot water. As we have said, the alkaline detergent removes only a portion of the milk deposits, leaving a part which is acid-soluble.

During the interval between milkings bacteria multiply and these must be killed before milk is allowed to pass through the machine.

The material which has the properties of removing the acid portion of the milk deposit and killing bacteria is the iodophor. These acid detergents contain iodine which is an extremely good sanitizer.

The iodophor is effective in cold water and should not be used above 46 deg C (some hot water iodophors are available). The concentration recommended is ¼oz to one gallon and this should not be exceeded unless the water is very alkaline. Flush each set of cups with 1 gallon of iodophor before milking.

Getting rid of milkstone

The routine for de-scaling a dairy plant recommended by the Rangitaiki company to its suppliers is:

(a) Add 5oz of phosphoric acid-based milkstone remover to a gallon of boiling water.
(b) Circulate through plant for 10 to 15 minutes. With a non re-cycling system, put through the plant three times.
(c) Rinse acid from plant with cold water.
(d) Follow with caustic rinse (1 tablespoon to 1 gal of hot water) and put through as for acid.
(e) Brush plant and dismantle releaser and other small components.
(f) Flush plant with 3 gal cold water to a set of cups.
(g) Sanitize plant before next milking at double strength standard iodophor.

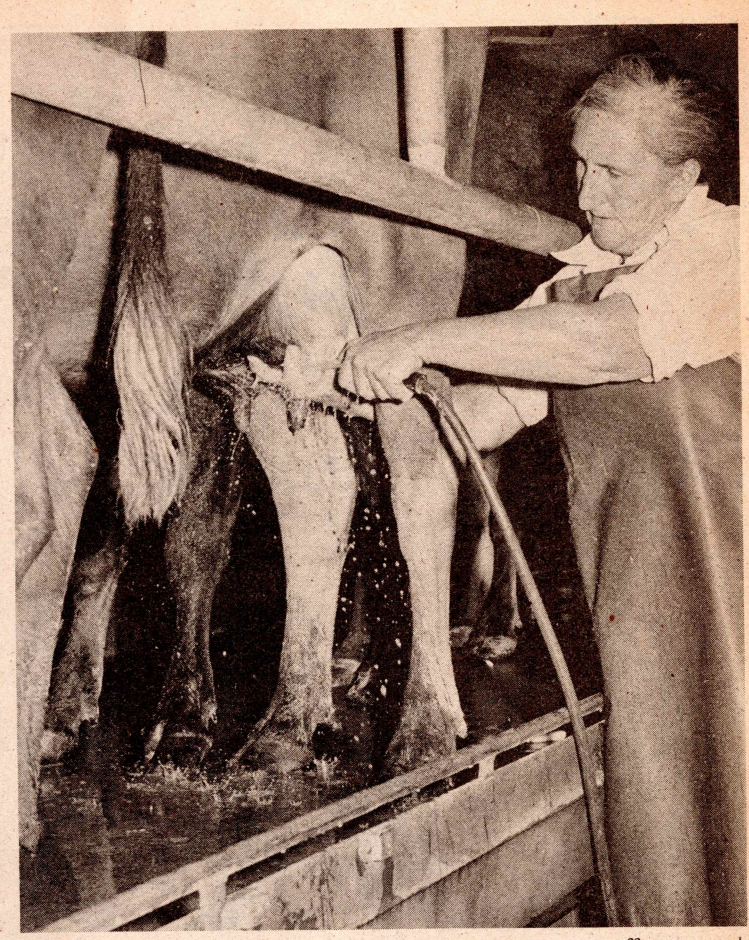
Enlarging on these recommendations Mr Twomey says:

It is essential that milkstone deposits be removed before starting a new cleaning system, and the best time to do this is during the dry period.

The best method for removing old milkstone is with phosphoric acid as already described. If a re-cycling system is not available then the dropper tubes may be removed from the milk line — the inlets being corked — and joined together to form a chain. The dropper tubes are connected to the end of the milk line and the other end placed in the acid cleanser at the releaser end.

An alternative to this is to fill the machine with hot acid and leave it to soak for about one hour. After treatment with acid the machine should then be washed with double-strength alkaline detergent or caustic soda at 82 deg C.

Acids other than phosphoric should not be used.



A hand scrub with running water gets the milking process off to a good start hygienically.

Cleaning the vat

An increasing number of farm vats (and eventually this should become universal) have equipment for in-place cleaning. If this cleaning equipment is to an approved design, and is properly installed and operated, it will give good results unless there are special problems in the water supply.

However, most vats sooner or later, and all vats where a new cleaning system is to be introduced, need de-scaling. The Rangitaiki company has universal in-place cleaning of refrigerated vats among its suppliers, and its recommendations for de-scaling are:

(a) Rinse vat with cold water and clean in the usual way.
(b) Make up a 50/50 solution of hot water and phosphoric acid, **with added wetting agent.**
(c) Scrub all vat surfaces with this solution and leave for 30 minutes. Repeat scrubbing with acid solution. Rinse with cold water and scrub with hot alkaline detergent. Rinse with cold water and sanitize with iodophor **double strength.**

This solution of phosphoric acid and water should be treated with all the precautions appropriate to any poison, particularly should it be kept away from children. It won't hurt the skin of the hands during scrubbing, excepting after very long immersion, but watch out for splashes in the eyes.

General advice

Of vat-cleaning in general, Mr Twomey says:

At present too many vats are not rinsed after being emptied until the next milking. During this period milk proteins are strongly attached to the vat surface and bacteria rapidly multiply.

Unless special efforts are made to clean and sanitize the vat it will be a source of contamination. Research work has shown that the manual

Please turn to page 7

The package deal that's guaranteed 100% effective for pre-milking sanitisation

The pre-milking sanitising rinse is vital to clear out bacteria and what better, more effective way than with **Klenz Iodophor**(containing Doversan).

When you combine the cleaning power of Klenzade detergents, the sanitising effectiveness of Klenzade Iodophors, and the farmer who follows pack directions to the letter, you get a 100% effective result.

KLENZADE

So if you're having a grading problem, contact a Klenzade representative through your Dairy Company and he will locate any problem areas fast.

KLENZADE DIVISION OF ECONOMICS LABORATORY NEW ZEALAND LTD

P.O. Box 10-061 Hamilton. Telephone 494-829.

Hildred Carlisle gives detailed case histories of proven product effectivness on the N.Z.B.C. "Country Roundabout" 5-6a.m. daily.

from page 5

cleaning of vats, while giving an apparent clean appearance, does not effectively remove bacteria from the surface.

Automatic vat washing systems can be effective in controlling bacteria.

One system is a single process system and consists of having a warm (43 deg C) iodophor solution held in a plastic barrel. When the tanker driver removes the milk he switches on a pump and the vat is rinsed with the iodophor.

This system is simple and generally efficient. In some areas it has been found necessary to use an alkaline cleanser in place of the iodophor once every two weeks. This is particularly so for refrigerated vats.

A second system is a multiple process one and requires participation of the farmer during some of the cycles. The tanker driver, after removing the milk, switches on a pump and the vat is rinsed with cold water. Before the afternoon milking the farmer prepares hot alkaline detergent (71 deg C) and connects the pumping system up for recirculation. The detergent is circulated for five minutes during which time the sight-glass tap and external surfaces of the vat are cleaned. The vat is given a final rinse with iodophor to kill the bacteria present on the surface.

Another system available is one giving a fully-automated sequence of rinse, detergent-wash, after-rinse and sanitizer.

In all vat-washing systems, some manual cleaning of the outlet tap and the sight-glass assembly is necessary.

It is essential to run a brush through the pipe connecting the sight-glass with the vat.

Effect of design and construction

The fewer bends and joints in the pipes, the easier will cleaning of the machine be.

The current trend to welded inlets attached directly to the milk lines will make a considerable contribution to easier cleaning. Where joints are present on milk lines it is common to find the areas on either side of the joint coated with milkstone. This milkstone has resulted from the fact that the metal at the joint is different to that of the line.

The connexion of two different metals causes an electric current when solutions flow over the surface. The milk proteins become attached to one of the metals and this results in the forming of a very resistant film of milkstone.

Such couplings arise from the connexion of dairy metal to tin, tin to brass, dairy metal to stainless steel, tin nickel alloy to tin, but not tin nickel alloy connected to stainless steel. Replating of the exposed brass, or replacement of the component with stainless steel, will correct the problem.

Presence of copper

Possibly the greatest single factor affecting the efficiency of recirculation cleaning is the presence of copper or brass in the circulation lines.

In some instances, farmers have installed detergent lines from the water heater to the pit and these are copper pipes. When detergent passes over components or pipes containing copper the copper dissolves. This copper is transported to milk contact surfaces, where it reacts with milk proteins to form a coloured milkstone which is very difficult to remove.

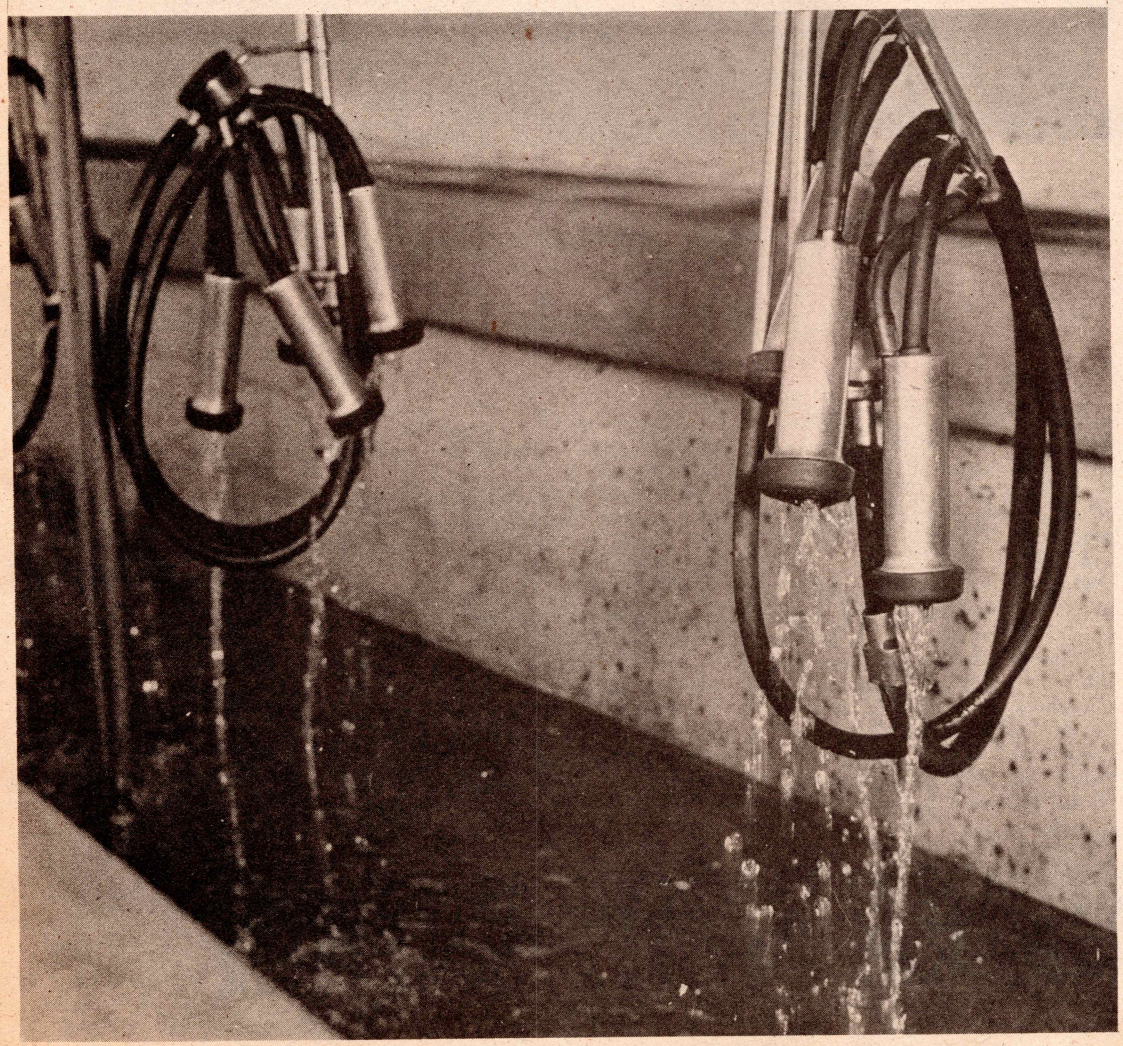
The copper is also taken up by the rubber components to act as a catalyst in the breakdown of the rubber structure.

The copper also absorbs on to stainless steel from where it is picked up by the milk, resulting in problems during the manufacture and storage of butter.

Stainless steel has been used very widely in recent years for machine construction. This material owes its resistance to chemical attack to the formation of an oxide layer at the surface. The steel will rust if this layer is disrupted. Exposure of the steel to oxygen is essential to maintain resistance. Coverings of milkstone on the surface of the steel may lead to pitting, this being accentuated by bacterial action in the milkstone.

Acids such as spirits of salts and spent factory acid will attack stainless steel and should not be used to remove milkstone from stainless steel surfaces.

The essential point in the care of stainless steel is the maintenance of the oxide layer by exposure to oxygen and complete removal of milk deposits from the surfaces.



Reverse-flow washing is a standard feature in many sheds now.

Please turn to page 9

"Alison" sets New Zealand record

"Burnt Hollow Alison" V.H.C.

"Tomoana" fed Cow Smashes All-Breeds Records For Milk and Butterfat

The South Auckland Friesian, Burnt Hollow Alison V.H.C., set the record for 8 year old cows by producing 31,201 lb. of milk and 1,398 lb. butterfat (4.5 test) in 305 days in 1972 – 73.

Previous New Zealand records for milk and butterfat production in 305 days were 25,650 lb. milk (1960/61) and 1,283 lb. fat (1970/71).

She is owned by Mr. D. C. Wallace of The Aratonga Friesian Stud at Karaka, South Auckland.

Burnt Hollow Alison was bred by Gebbie Bros. of the Burnt Hollow Stud at Teddington near Lyttelton. She was sold as a rising 3 year old to Mr. M. B. Leslie who then had his Lesdale Stud near Christchurch.

The current owner, Mr. Wallace, purchased her at Mr. Leslie's dispersal sale in September 69.

Since then she has produced 737 lb., 784 lb., and 930 lb. of fat before her present dual record performance.

Her following performances are considered to be unique – 80 lb. milk in a single milking and an average of over 140 lb. milk daily over three consecutive months.

Alison was fed grass in the paddock plus silage in the morning, hay in the evening plus TOMOANA Dairy Ration Crumbles.

The Aratonga Stud is fortunate in having two daughters of Alison. A two year old son was exported to Australia for artificial breeding. Alison is now in calf, through artificial insemination to an exceptionally well bred American bull.

FOR TOP PRODUCTION

TOMOANA DAIRY RATION

MEAL and CRUMBLES

Distributed by W. & R. Fletcher N.Z. Ltd., Auckland. Available through Dairy Co's., Stock and Station Agents and Produce Merchants

W 5929

Effect of foaming on milk quality: rancidity in milk

Milk contains an enzyme, lipase, which will under certain conditions, split milk fat into its components — glycerol and free fatty acids.

Some free fatty acids have a bitter taste and a sharp odour and, if present, give milk an off flavour. Such milk is said to have gone rancid.

Rancidity in milk can develop in a number of ways — by subjecting milk to temperature fluctuations, by mixing raw milk with homogenized milk, and possibly most important of all, by agitating or foaming milk excessively.

The formation of off flavours in milk following excessive foaming at various points in the machine has been quite a problem in some other countries, but is at present causing little concern New Zealand.

Alan Twomey says that recent tests have shown that our milk is generally low in free fatty acids indicating that excessive foaming is not a major problem here.

Despite this, he says, problems can arise if milk is allowed to foam excessively in any part of the machine. Specific things that will promote foaming are:

- **Running the diaphragm pump too fast.**
- **Air leakages**
- **Overmilking.**
- **Spinning vat agitators before sufficient milk has been run into the vat to cover them.**

Mr Twomey says that the laboratory's recent work has shown that there's little relationship between milk line size and amount of foaming. Also, he says, one design feature which has promoted foaming troubles in the past has now been rectified. This was the way droppers were attached to the milk line: Until recently, droppers hit the milk line at right angles but now almost all manufacturers have them entering the line at a tangent. Such an arrangement lessens the amount of foaming in the line.

Excessive foaming can lower a farmer's milkfat test drastically due to the release of free fatty acids.

1974 footnote on care of farm vat:

Workers at the Waikato Dairy Laboratory, who have had a wealth of experience with problem grading cases, are currently finding the farm vat and nearby equipment to be the biggest single cause of grading problems.

Laboratory superintendent Alan Twomey attributes 95% of all grades to bacterial contamination at or near the farm vat.

Many farmers seem to be relying too heavily on their in-place cleaning (IPC) systems for removing deposits and overlooking the regular use of hot phosphoric acid solution (as described earlier in this section).

Compounding the problem has been the fact that while farm vats have tended to become bigger and bigger as farmers increase their scale of operation, pumps used to power the IPC systems have not been scaled up at the same time.

The scrubbing brush

The scrubbing brush itself has been found to be the source of grading problems too. It is possible that the vat can actually be contaminated by a dirty brush during "cleaning."

Alan Twomey says that there are other milk-contacting surfaces in or near the vat that should not be neglected when the vat is scrubbed down. The vat washers themselves can become contaminated: These have been shown to be quite frequent cause of contamination. The agitator blades and vat outlet also require attention.

And still often overlooked as a source of contamination is the sight-glass. This should be washed thoroughly after every pick-up.

Some suppliers take a reading of milk in the vat straight after the morning milking and then merely flush the sightglass out with a cold hose. A film of fat can build up inside the tube if this is done regularly. The company hygiene officer in one district where this has been a noticeable problem says that either readings should not be taken in this way or the sightglass should be washed out with hot iodophor following the reading.

Dirty receiving tanks also contribute regularly to grading problems. Indeed, any surface near enough to the flowing milk to possibly cause contamination should be cleaned regularly.

Milk filters

Dirty in-line milk filters incur grades, too. If paper filters are used, they should be changed every milking. Cloth filters should be washed after milking with a good detergent, rinsed well and left to dry in the sun. They need to be washed well since the cloth can become impregnated with fat — ideal for bacterial build-up.

Stainless steel mesh filters should be washed and cleaned after every milking. Impurities will also build up on these filters after a period, so they require constant inspection.

They should be soaked in a proprietary acid solution (with very hot water) for half an hour and then soaked in very hot caustic soda solution for ¼ hour before rinsing with a pressure hose.

The in-line filter should always be in place when either milk or cleaning liquid is pumped through the cooler. If it is removed before cleaning, foreign matter will become lodged within the plate cooler and grades could follow.

Careless handling of cups can cause grades. Bacteria-laden water can be sucked off the shed floor into the milk line if cups are swung on to the cow carelessly.

Brushes used to scrub udders, and bars of soap, can be highly efficient spreaders of sediment and bacteria. Most dairy hygiene advisers suggest that brushes and bars of soap be replaced by a hand wash using warm running water aided by liquid soap from a dispenser. Aprons have also been shown to be contaminated.

Inflations afford a prime site for bacterial build-up. Absorption of fat into the rubber — and the consequent build-up of bacteria — can be prevented by cleaning the plant thoroughly using an approved cleaning system.

Water supply

The problem of an unhygienic water supply can be compounded when udder wash water is held in a header tank mounted on the roof. Soaring temperatures in the heat of the day encourage bacterial growth. One solution is to use a proprietary device to add metered quantities of iodophor to wash water before it reaches the droppers.

If wash water is the suspected cause of grades, a sample should be sent to the company or an analyst in a sterilized container for chemical and bacteriological testing.

If a farmer is having a grading problem and if the cause is not immediately obvious — like clearcut defects in the cleaning procedure — swabs may have to be taken at various parts of the plant so that the source of contamination can be found.

It's worth noting that not all milk-contacting surfaces need to be stainless steel for high-quality milk to be produced. Alan Twomey found a few years ago when surveying a number of top-quality producers that only one had all stainless steel equipment.

He says that stainless steel is only becoming essential because of the effect that copper and copper alloys have on the quality of dairy produce, not because it is impossible to produce quality milk without an all-stainless plant.

At the same time, though, it's highly likely that some grading problems will be solved if a wornout milking machine is replaced.

Please turn to page 11

MYCOSAN

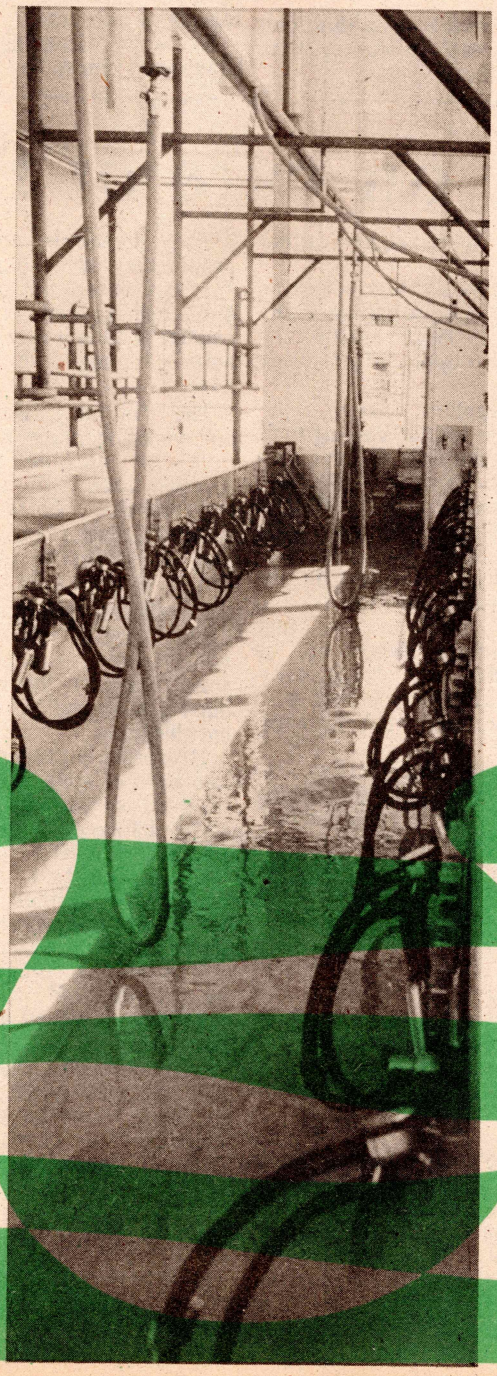
one pack total dairy hygiene system

When it comes to dairy hygiene, Mycosan does it all— in one easy operation.

Mycosan is a 3-in-1 cleaner/sanitizer. A versatile dairy product which achieves standards of hygiene normally requiring three or more products.

Mycosan is safe for use in all stainless steel plant and vats, on rubberware and plastic connections. Safe and exceptionally efficient for both pre-milk rinsing and post-milk sanitizing/cleaning.

Mycosan contains a selected quaternary ammonium compound, phosphoric acid and a biodegradable detergent. This unique detergent additive and high phosphoric acid content combine to prevent the build-up of milkstone in the course of normal dairy hygiene routine.



And because Mycosan's activity increases in hot water, it combats thermo-duric bacteria, thus promoting better standards of milk production.

Chances are your local Dairy Company is already using Mycosan. Chances are it could make your dairy hygiene routine a whole lot easier and more effective. Try it.

IWD animal health

IVON WATKINS-DOW LTD

Box 144, New Plymouth

"Trickler" to add sanitizer to udder wash water

The "Trickler" system is an efficient, economical way of adding small amounts of sanitizer to udder wash water. The dispensing unit — see picture — is mounted upside down on a roof support, so that iodophor concentrate can gravitate down a length of plastic tubing and enter the udder wash water at a venturi unit.

This venturi unit is an all-plastic device. It is fitted with a one-way valve which prevents wash water from travelling up to the dispensing unit and can be connected into the udder-wash pipeline, using two short pieces of ordinary milk tubing as sleeves.

A Trickler unit can be used in this way whether a header tank or an overflow water system is used.

When used to meter iodophor concentrate into udder-wash water, this simple but effective dispenser should be a great ally for the farmer fighting mastitis in his herd. Farmers using the unit in this way should also find no need to continue using soap — iodophor, of course, gives water a slippery feel — and there's a possibility that milk grades will be more easily avoided as well.

The rate of addition of iodophor concentrate to the wash water can be altered by adjusting a screw clamp. There is an on/off tap as well. The Trickler lid can be screwed directly on to the flagon containing iodophor concentrate. Either a half-gallon or a one-gallon flagon can be used, although if a one-gallon flagon is used it must be of the round, thick-walled type.

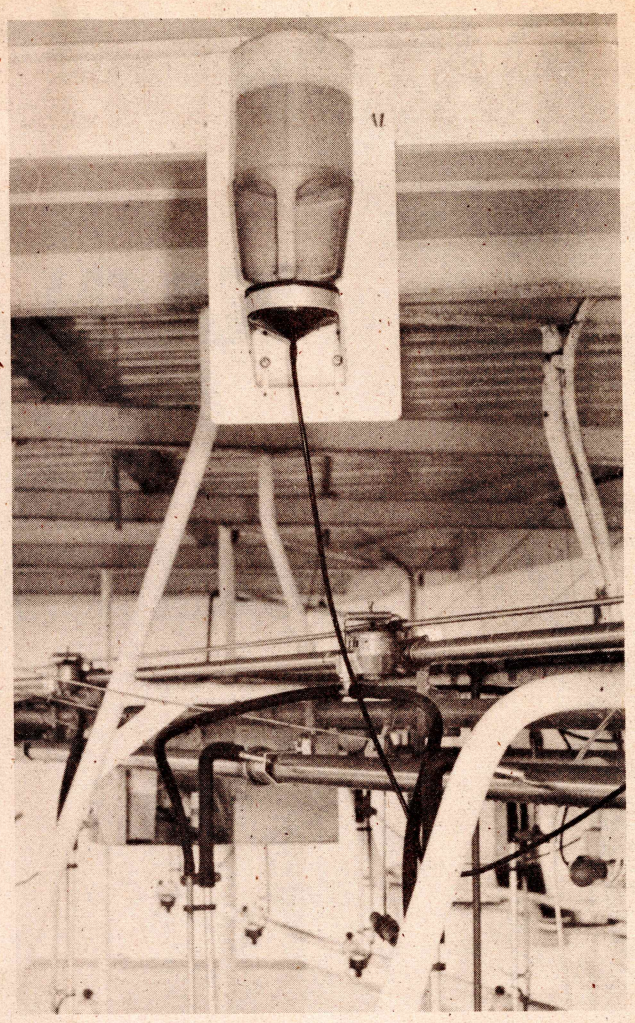
A test run is then made to check how much iodophor is being added. The colour should just be noticeable in the wash water but this can be checked by comparing a bucket of wash water with another bucket containing a solution made by putting 3cc of iodophor in a gallon of water.

The screw clamp setting can then be altered if necessary.

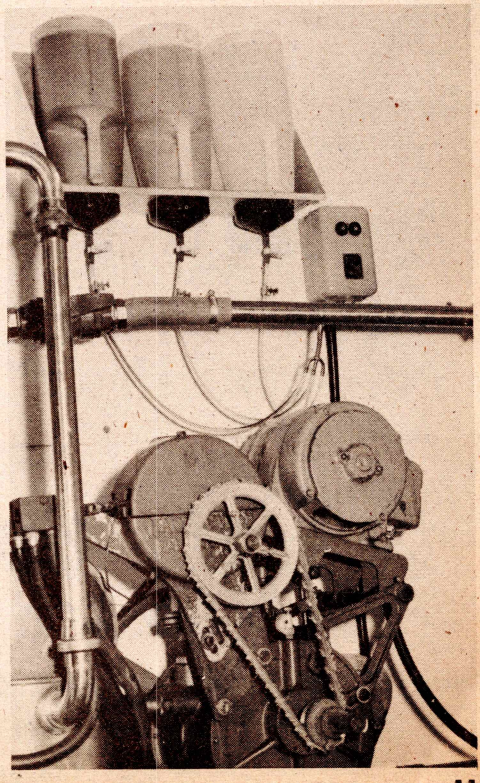
The standard control rate of 1:1500 can be increased a lot for specific problem control and may have to be altered for different batches of iodophor concentrate since viscosities can vary markedly.

Three slightly modified dispensers can be put to another use in the shed — to add pre-determined amounts of various concentrates, like liquid detergent, iodophor and non-ionic concentrate to water used for back-flushing the milking machine.

When dispensers are used with back-flushing systems, set amounts of any concentrate can be released into the washing water merely by opening a tap. And, within a minute or so of one dose being released, a dispenser will recharge itself automatically with concentrate so that another dose can be released when the tap is again opened.



Above: A "Trickler" dispenser set up to dispense iodophor concentrate to udder wash water.



Right: Three dispensers set up to add specific amounts of detergent, non-ionic concentrate and iodophor solution to a reverse-flow washing system.

WASH AWAY MASTITIS AND MILK GRADES

The Trickler is a device to automatically add sanitiser to udder wash water to cure dairy hygiene problems right where they start. It has long been accepted that this method of disease prevention would be the most effective, but until the advent of the Trickler, there was no way to do this. The Trickler is available now from your dairy equipment store. Ask for one next time you are there.

the TRICKLER

Prevention that beats finding a cure.

New Zealand Distributors: NATIONAL DAIRY ASSOCIATION of N.Z. LTD.

MANUFACTURED BY: TOPMILK DEVELOPMENTS LIMITED, R.D.1, CAMBRIDGE, NEW ZEALAND

Bacteria and milk

Bacteria are never absent from milk, even when it has just come from the cow.

Microbiologists say that milk straight from the cow has an average bacteria count of 1000 to 2000 per ml. As this milk passes through the milking plant, it collects more bacteria, the actual amount collected depending on the standard of hygiene of the plant. And in the farm vat the bacteria multiply rapidly, unless the vat is chilled.

Bacteria affecting milk fall into two broad classes. There are the rapid milk spoilers which can grow in milk even if it is refrigerated; and those which are not so active in milk spoilage but which resist pasteurization and contribute most of the bacteria which occur in the final product. These latter are called thermoduric bacteria.

The thermoduric bacteria are almost completely derived from milkstone on the milk contact surfaces of the milking machine and the farm vat. In dry weather some may be derived from dust.

The use of very hot water and inefficient cleansers, which result in the formation of milkstone, cause high thermoduric bacterial counts in milk.

The other bacteria which cause considerable milk spoilage before pasteurization are derived from many sources, in most cases the milking machine and the farm vat which have not been properly cleaned and sanitized being the most important.

A potent source of bacteria with a spoilage potential is the water supply. There is very little information available on the bacteriological quality of New Zealand farm water supplies. Work at Ruakura has shown that many bacterial types found in milk have come from the water supply.

It is for this reason that the practice of back-flushing cups with water is not recommended so warmly now as it was a few years ago.

The use of storage tanks or open troughs for rinse waters is most often the source of the bacteria and these points should be chemically treated at intervals to prevent the build up of bacteria.

In a similar way, water used for udder washing may leave a large number of bacteria on the teats.

Improper washing of soil and dung from the udder also contributes to the number of spoilage bacteria in milk. Cows which have grazed in swamps or walked through bogged areas on the way to the shed are a potential source of spoilage bacteria and should be well washed with clean water and soap before milking.

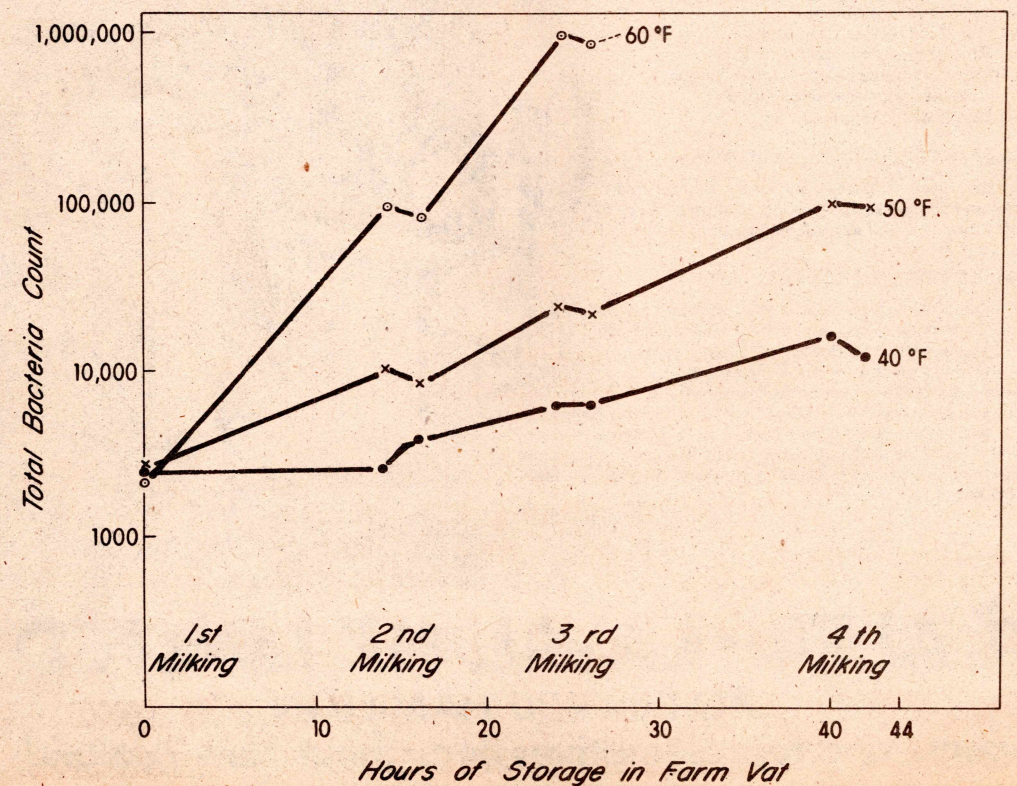
Spoilage bacteria may also come from mastitic cows. If cooling is inadequate these bacteria may multiply in the milk. These bacteria are usually unimportant unless the herd is highly infected with mastitis.

If cleaning and sanitizing of the machine and the farm vat are not thorough, spoilage bacteria will remain on the surfaces and multiply between milkings.

Particular points of contamination are joints on the milk line, cracked and broken rubberware, milk delivery lines from the milk-lift pump to the vat and the surfaces and taps, etc, on the vat. An awareness of these as trouble spots is half the problem solved; attention to these details is the other half.

Bacterial growth in milk can be checked substantially by paying strict attention to hygiene in the shed and by chilling the milk in the farm vat.

Effect of Cooling Temperature on Growth Rate of Bacteria



Alfa-laval equipment can increase production now-

Save you money later.

Fit Alfa-Laval equipment now, to existing plant, whatever the make, and you'll have cash in hand later. Then, when you change your milking plant to meet the 1977 stainless steel regulations, the total will have cost you less! Alfa-Laval guarantee that. Savings that could amount to hundreds of dollars. In the meantime it's increased production and more profit.

INCREASED PRODUCTION NOW:

Alfa-Laval hydropulse conversion fits any machine and will milk faster, requiring less labour and therefore earn you more money. These advantages show how Hydropulse can effectively increase your profit margin:

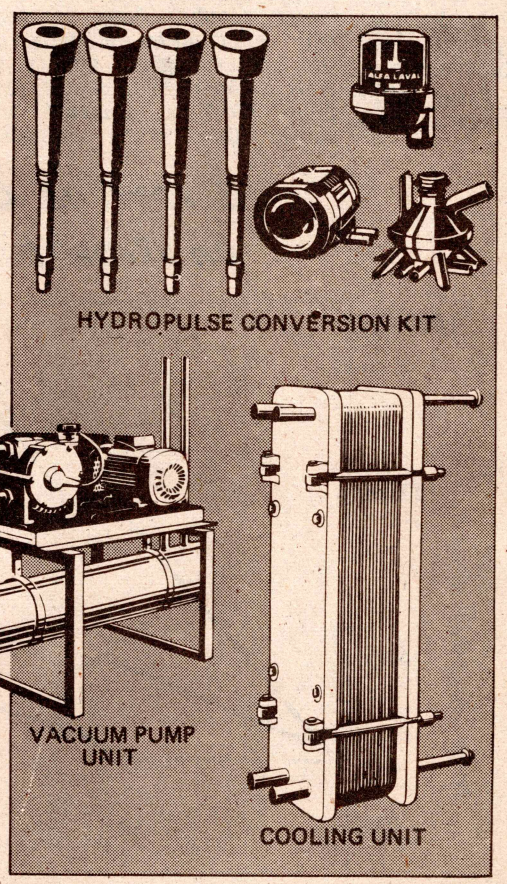
- Milk yield increased up to 5%
- Milking time down by up to 15%
- Improved udder health through gentler action, shorter machine time.
- Less machine stripping.

INCREASED EFFICIENCY, SAVE SPACE:

Alfa-Laval vacuum pump unit easily fits existing dairies and connects with existing machines. Built-in moisture trap and self-draining vacuum tank ensures total efficiency.

COOLING MORE MILK IN LESS TIME:

Alfa-Laval plate coolers have large contact surface areas giving the maximum cooling effect. Designed specifically to remove heat from the milk rapidly to within 2°C above that of the coolant temperature. In two sizes, both with many platage possibilities.
Alfa-Laval equipment is developed for New Zealand farmers, guaranteed reliable and backed by worldwide research. Call the agent nearest you now. He'd like to explain more about how to increase production now and save money later. No obligation of course!



ALFA-LAVAL NZ LIMITED

P.O. Box 430 HAMILTON

Agents and representatives throughout New Zealand

462

CLEANING SYSTEMS

The development and continued improvement of in-place cleaning systems over the past few seasons has meant that the once-tiresome task of "cleaning up" after milking has become most streamlined in many sheds.

While expensive initially, such systems are very nearly a "must" in larger sheds where there's more and more pressure on labour to get through the milking process in reasonable time.

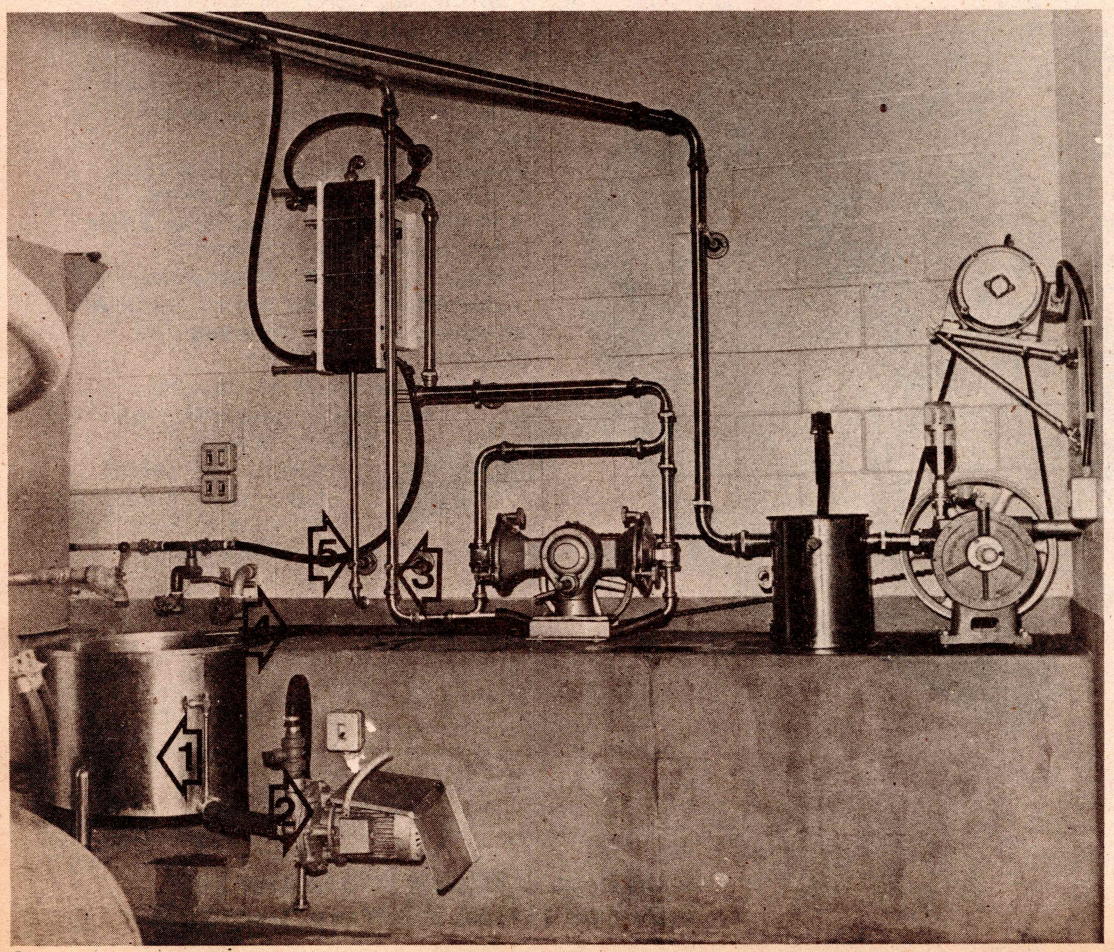
The efficiency of any system of in-place cleaning is markedly affected by its design and installation, so expert advice should be sought if such a system is contemplated. It should be noted, incidentally, that the rotary milking system lends itself very well to efficient in-place cleaning.

In this section of the booklet, we include brief descriptions and pictures of several in-place cleaning systems that have proved their worth.

The section concludes with a resume of tips on the design and installation of reverse-flow cleaning systems.

A rotary cleaning system

The figures in this picture depict the well-developed in-place cleaning system in Graham Wilcox's shed at Clevedon. The function of the numbered parts, and the sequence of operations for in-place cleaning, are described in the accompanying article.



The back-flushing and vat-cleaning system installed in Graham Wilcox's "Turnstyle" at Clevedon typifies the kind of sophisticated accessory equipment that it is possible to incorporate into rotary systems.

The accompanying photograph shows the milking plant on the wall of the milker adjacent to the turntable. The tank (1) holds flushing liquid which is pushed through the machinery on the platform by the pump (2). For this, the pump's hose is connected at position (3).

This back-flushing results in about 2½ gals of water coming through each set of cups. The cooler is flushed out by the diaphragm milk pump which sucks liquid out of the flushing tank through the hose (4). For in-place cleaning of the milk vat, the pump's hose is connected at position (5).

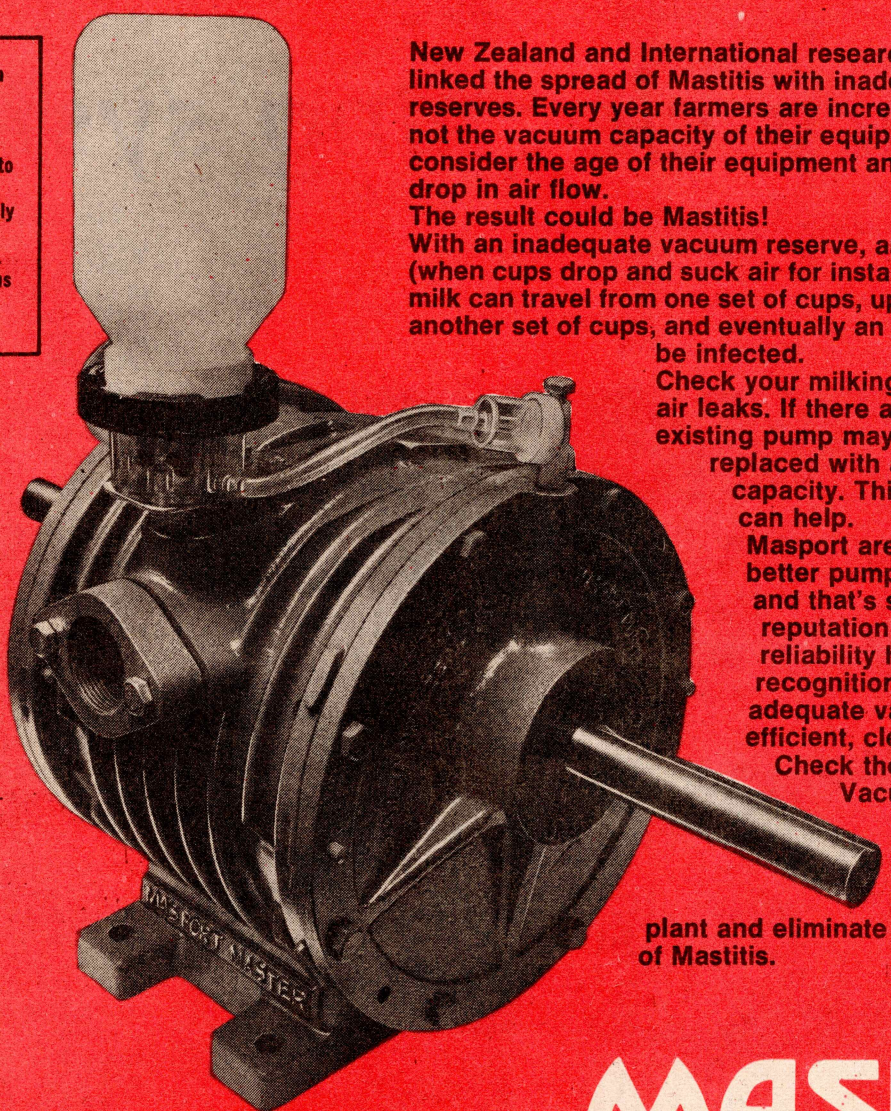
Vat cleaning can be set going by the tanker driver. The flushing tank (1) is filled by the milkers before they leave the shed and the pump hose is coupled up to the milk line at position (5). A valve further along this line is switched so that when the pump is started, water will be diverted through nozzles set inside the milk vat.

When the tanker driver presses a button, the vat is sprayed for 40 seconds, then the pump is automatically cut off. When the milkers arrive for the

Please turn to page 17

Your mastitis problem may only be a vacuum problem

- ★ Oil reserve seen at a glance.
- ★ Visible metered oil flow.
- ★ Continuous oil flow to ballraces.
- ★ Every pump rigorously factory tested for a minimum of 2 hours.
- ★ New porting locations give increased efficiency.



New Zealand and International research has definitely linked the spread of Mastitis with inadequate vacuum reserves. Every year farmers are increasing herds, but not the vacuum capacity of their equipment nor do they consider the age of their equipment and the consequent drop in air flow.

The result could be Mastitis!

With an inadequate vacuum reserve, any loss of vacuum (when cups drop and suck air for instance) means that milk can travel from one set of cups, up the pipeline to another set of cups, and eventually an entire herd can be infected.

Check your milking plant carefully for air leaks. If there are none, your existing pump may need to be replaced with a new pump of greater capacity. This is where Masport can help.

Masport are now producing even better pumps than ever before, and that's saying something. Their reputation for quality and reliability has won international recognition. A new pump will give adequate vacuum reserves and efficient, clean milking.

Check the range of Masport Vacuum Pumps with your milking machine supplier — select the correct model for your milking plant and eliminate this possible cause of Mastitis.

MASPORT
VACUUM PUMPS

A division of Mason and Porter Ltd
P.O. Box 14-349, Panmure, Auckland.

AA2093

CLEANING SYSTEMS

from page 15

afternoon milking, they can complete the vat cleaning by flushing with water and sterilizing agents.

Two-way flow system

Another in-place cleaning system incorporates a flow of liquids in both directions, and this, according to investigations at Ruakura, has a beneficial effect by giving a "scrubbing" action to the inner surface of the pipes.

An example of this system is set up on the rotary at Ruakura's No. 1 dairy (see lower picture).

Cleaning solutions are introduced directly into the milk-line and milk system for soaking and then other solutions are made to flow in the reverse direction, passing into the air-line first. A reversing valve is located in the turret in the centre of the platform.

Routine with this system is: A non-ionic detergent at low concentration is used to flush out the system, entering by the air-line. Cold water is pumped in the same way to give added rinsing.

Then an alkaline detergent solution goes in through the milk-line and is left there for a three-to-five minute soak.

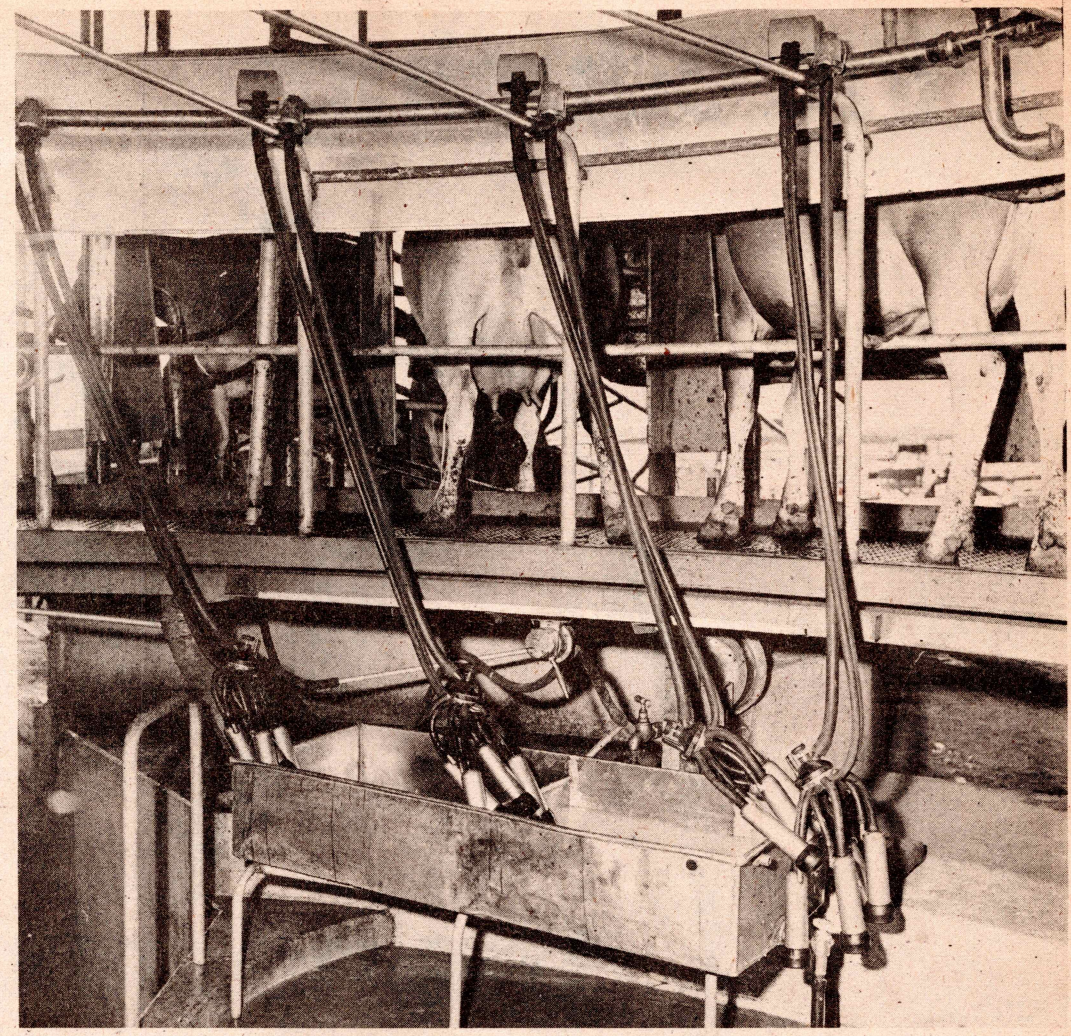
After the soaking, the flow is reversed and the alkaline solution is pumped out in the reverse direction. Finally, hot water or an iodophor sterilizer is passed through the plant, entering at the milk-line.

Cluster cleaning in a rotary

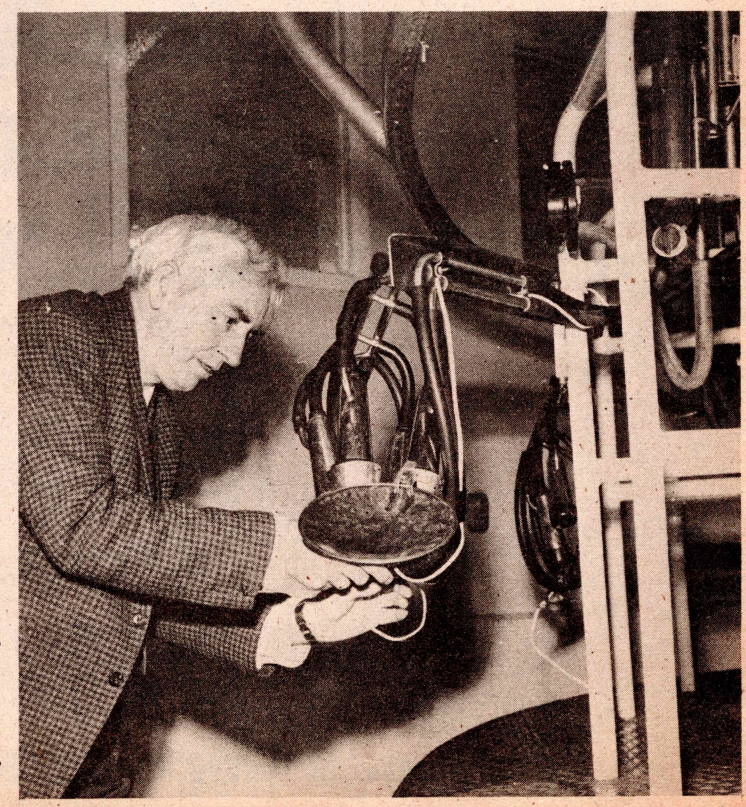
One phase of machine cleaning made possible by the advent of rotaries (important in mastitis control) is cluster-cleaning between each cow.

The cups, when not in use, hang directly downward on their rubber tubing well clear of the platform. This allows them to be dragged through a stainless steel vat with two compartments, the first antiseptic, the second clean water, as they move around.

Please turn to page 19

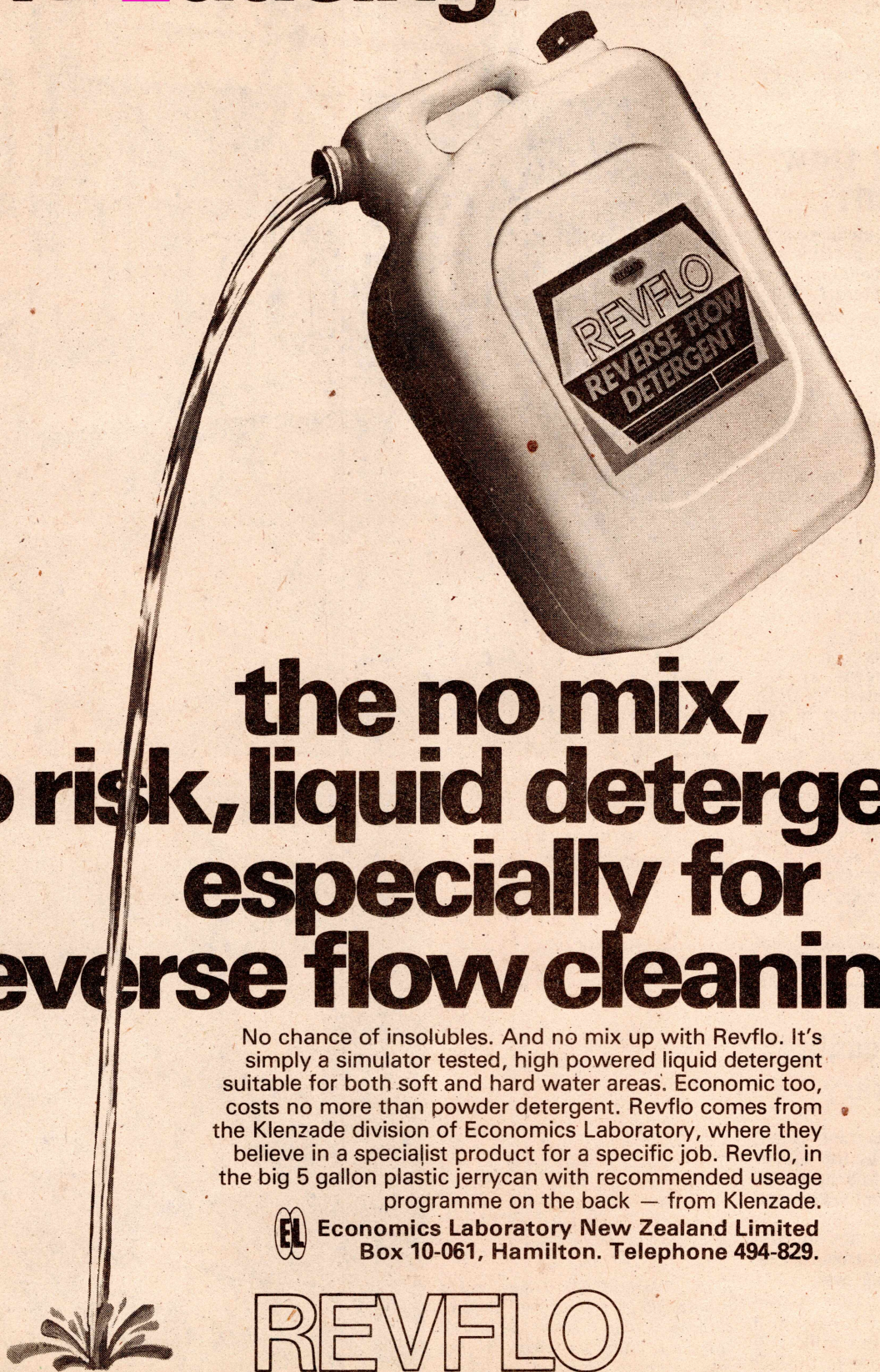


Above: In the Petersen shed the cups are dragged through two tanks as they move round, the first tank containing antiseptic solution, the second water.



Right: Ruakura's No. 1 dairy has a two-way-flow system of in-place cleaning. Jetting brackets are simply suspended from the cups as they hang in their permanent positions. Here, Mr Doug. Phillips, of Ruakura, is plugging a set of cups on to the jetter.

Introducing:



the no mix, no risk, liquid detergent especially for reverse flow cleaning

No chance of insolubles. And no mix up with Revflo. It's simply a simulator tested, high powered liquid detergent suitable for both soft and hard water areas. Economic too, costs no more than powder detergent. Revflo comes from the Klenzade division of Economics Laboratory, where they believe in a specialist product for a specific job. Revflo, in the big 5 gallon plastic jerrycan with recommended useage programme on the back — from Klenzade.

Economics Laboratory New Zealand Limited
Box 10-061, Hamilton. Telephone 494-829.

REVFLO

made for reverse flow cleaning

Pointers on setting up a reverse flow washing system

• Select pump to give minimum of 3 gallons a minute discharge from the teat cups.

• Site pump so that it will have flood suction for both hot and cold water (avoids risk of steam becoming trapped in suction pipe when changing from hot back to cold water).

• Keep all suction pipe runs to the pump as short as possible, with a minimum of bends. No elbows or Tees should be used at all.

• The delivery line must also have a minimum of bends and the overhead pipe to the receiving can must be kept as low as possible.

• A large reservoir of at least 1500 gallons should be available for reverse flow washing, milk cooling, udder washing, etc.

• The temperature of hot water for reverse-flow washing should not exceed 180deg F (82deg C).

• For some plants, wheel valves can be better than quick-action valves, since they avoid excessive back pressure on the fittings when opened slowly.

• Support the clusters so that all four teat cups discharge the washing water evenly. Air pockets may form if this is not done.

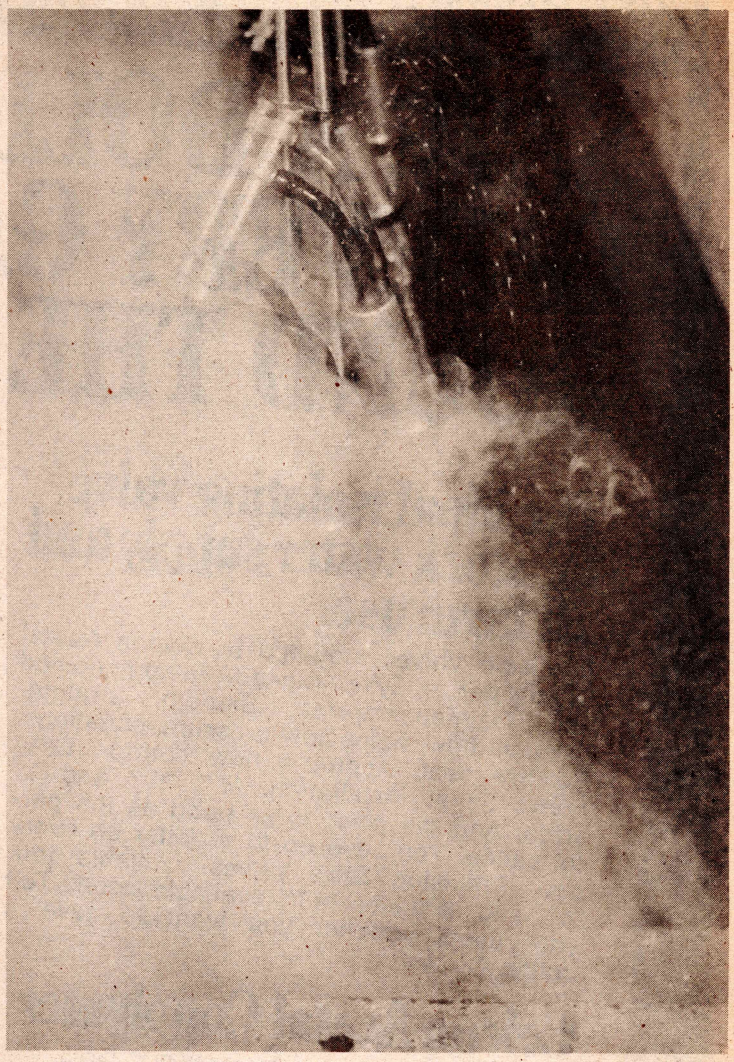
• To avoid a dirty backwash in the very end of the milk line, cut the pipe as near to the last milk nozzle as is practicable, allowing only sufficient room for the plug to be inserted tightly without cutting off the entry hole in the milk nozzle.

• Milk line plugs should be removed immediately after reverse-flow washing so that they can be checked for residual milk deposits.

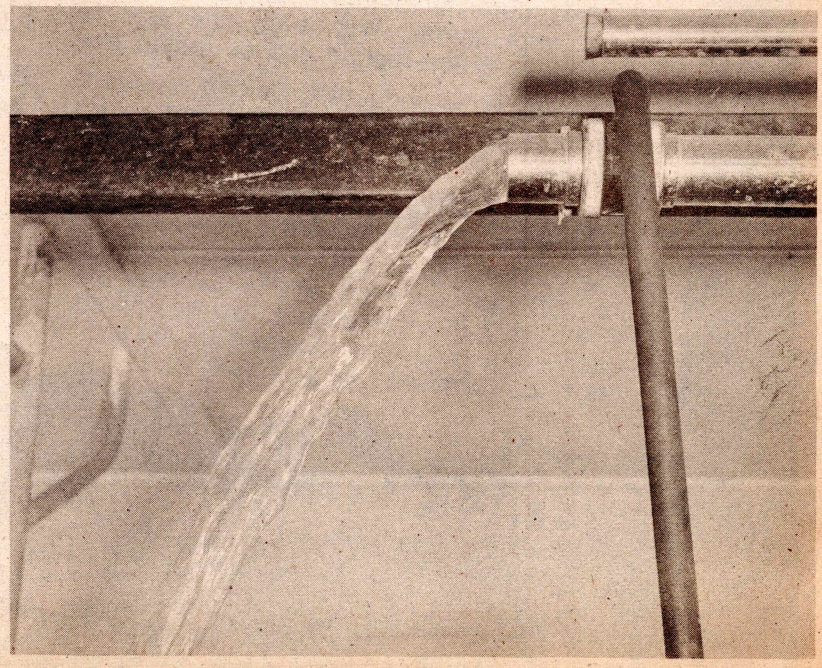
• Remove lid of vertical receiving cans once a week and clean upper section with a brush. Because the milk-line entry is often a few inches from the top of the can, the area above the pipe does not completely flood due to the formation of an air pocket. Therefore, it must be cleaned by hand.

• Milk indicators must be made water tight for reverse-flow washing.

• Careful attention must be paid to detail when a reverse-flow washing system is designed. In many cases where there has been an insufficient discharge from cups, the fault has been traced to under-sized and complicated pipe layouts.



A cloud of steam rising from a set of cups as hot water is pumped through by a reverse-flow washing system. Minimum rate of water flow through each set of cups should be three gallons a minute.



The flow of cleaning water should completely fill the milk line if the latter is to be cleaned completely. The end plug should be removed straight after washing to check that there is no deposit in the end of the milk-line.

SAVE A DOLLAR ON EVERY GATE~VALVE ROUND THE FARM

The ideal isolating valve for stock water supply and all farm use:

Precision Valves moulded in Celcon Acetal Copolymer, they're rugged, uncomplicated and maintenance-free. Smooth, straight-through flow helps low-pressure situations. Positive seal. Accurate flow control. Easy conventional installation. ½", ¾" and 1" sizes. And the price is as good as the performance. You save up to a dollar on every one. Precision Stop Valves available too. ½" and ¾" sizes—1" available soon. Tell your usual supplier you want to save a dollar. Or two.

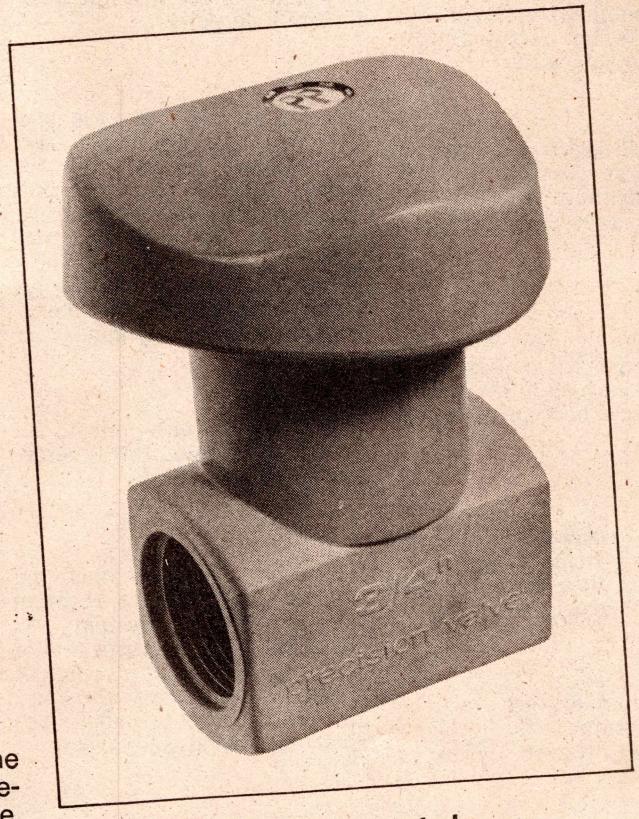
Celcon Acetal Copolymer has been performance~proven for over ten years

in agricultural, plumbing, chemical and marine valve applications. With high chemical resistance. It's non-rusting and corrosion free.

Thermally non-conductive, Celcon retains its strength and impact resistance under most conditions.

Award Winner!

Precision Plastics Ltd's ¾" Gate Valve carried off the coveted Building Section prize at the 1972 Plastics Institute awards competition—and holds the Designmark Award of the N.Z. Industrial Design Council.



Every Precision Valve is tested before packing. Guaranteed 100% leak-proof.

SEND THIS COUPON NOW FOR FREE LEAFLET.

To **Precision Plastics Ltd.,**
P.O. Box 8815, Auckland.

Please send me leaflet "Everything you need to know about Precision Valves."

NAME .....

ADDRESS .....

.....

PRECISION VALVES

NZ PATENT No. 165998 APP Applied for.

Designed and manufactured by

PRECISION PLASTICS LTD.

Available from Plumbers' Merchants, Stock & Station Agents, Hardware Stores and Dairy Co-ops.

MASTITIS and milk quality

Contrary to what is generally thought, mastitis is not a major cause of downgrading of milk. Alan Twomey says that it is probably responsible for less than 1% of grades that occur.

He thinks that far too much emphasis has been placed on the effects of mastitis through using the methylene blue reductase test.

The point at which mastitis does actually affect the grade is when large numbers of streptococci are released into the milk. Some strains of these are capable of reducing methylene blue. But most commonly, mastitis has little effect on final grade.

But it IS vital that mastitis incidence be kept to as low a level as possible since it seems inevitable that legal limits will be set for somatic cell or leucocyte content of milk before too long. The EEC limit is currently 500,000 cells per ml and it seems likely that the New Zealand dairy industry will be forced to set a similar limit so that products may be more easily sold to EEC countries.

Only about 10% of our dairy farmers would be liable to penalty if this limit was imposed here tomorrow. But the fact that a high incidence of mastitis means less net income for the dairy farmer — caused by a fall-off in actual production, by the need for culling those cows chronically affected, and by the added cost of curative treatment — makes it well worth while paying attention to measures likely to lessen the disease's incidence. And, of course, the 10% of farmers who are currently supplying milk with cell counts that exceed the EEC limit are likely to face downgrading in future if they do not tackle their mastitis problem.

Reduction programme

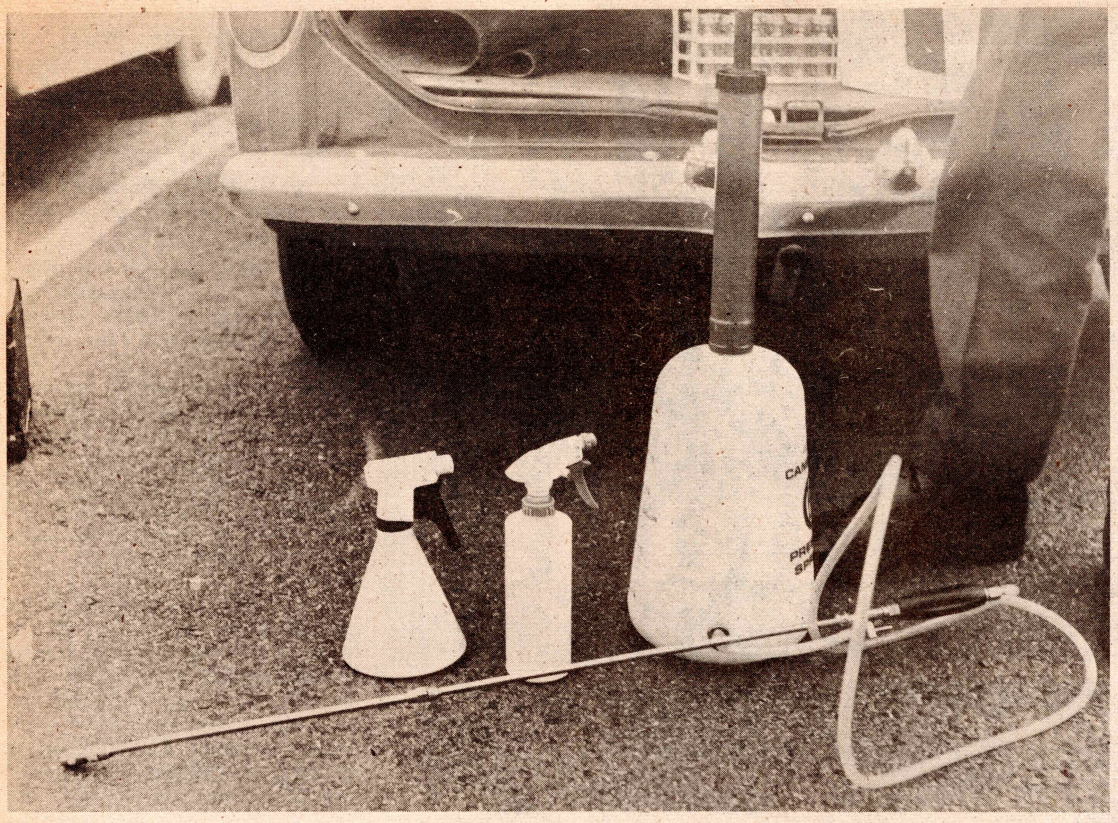
A "Five Point" programme is currently recommended for reducing the effects of mastitis. It comprises:

- Testing the milking plant.
- Teat dipping or spraying.
- Treating clinical cases when they occur.
- Dry cow therapy.
- Culling those cows that don't respond.

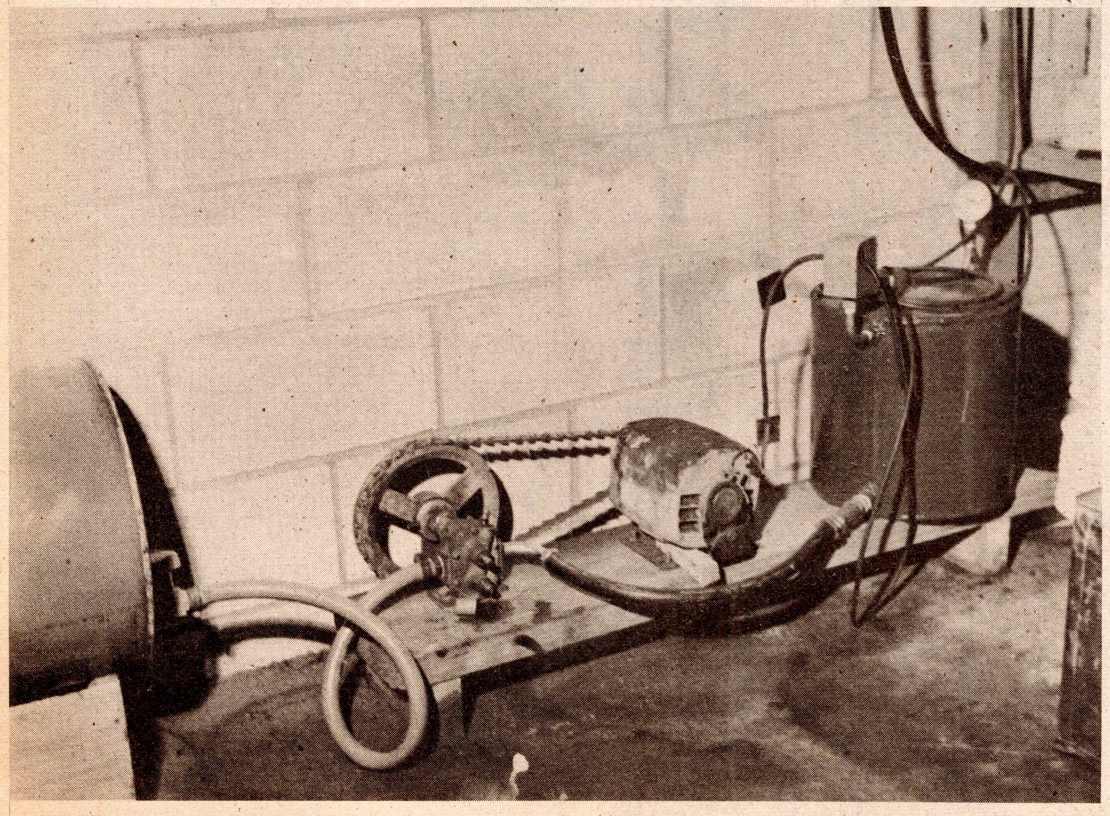
Mastitis control programmes in both the UK and the USA

Please turn to page 22

Teat spraying is considered by many to be one of the most effective single anti-mastitis measures that can be carried out. Here, Mr A. F. van Hellemond uses his motor-driven sprayer.



Three portable teat sprayers. With the one on the right enough pressure to spray a row of cows can be built up by pumping a plunger a few times. The top of the plunger is out of sight in this picture.



Milkroom gear for Mr van Hellemond's mechanical sprayer. From left to right: Drum holding spray liquid, pump, motor, anti-backflow valve, pressure tank and (out of sight) vertical strainer.

MASTITIS

from page 21

have successfully demonstrated that subclinical mastitis can be reduced from about 30% of all quarters to less than 10% by the application of only two of these measures — teat dipping and dry cow therapy using antibiotics.

• Testing the plant:

Few mastitis outbreaks are now traced to machine design, but occasional errors are still made which can contribute to high cell counts. In old plants sharply-angled bends somewhere in the milk line, for example, can encourage the formation of a bacteria-rich deposit just past the corner. Detergents sucked through the machine can have little effect on these deposits.

Milking plants tend to be about the most abused piece of machinery on the farm, despite the fact that they are possibly used the most. Some replacement of worn-out parts might solve a grading problem.

At each milking, the farmer should check his vacuum pressures, pulsation rate, air bleeds and liners. And the machine should be tested regularly — at least once a season — and all faults corrected.

• Teat dipping or spraying:

Either method of disinfecting udders after the cups have come off is effective. Teat dipping is most thorough, but it's a slow process. Spraying is now more common and can be just as effective because the sprayed solution runs to the bottom of the teat and forms a droplet there. This obstructs the passage of bacteria into the teat canal.

The main advantages of spraying as opposed to dipping are that it is less wasteful (on disinfectant) and that there's less risk of cross comtamination. Disadvantages are that application can be haphazard and that there's some danger of operators sniffing the iodine and phenols used.

A chlorhexadene-iodophor mixture makes the best spray. And adding glycerine or emulsified paraffin to the spray mixture makes it a useful anti-teat cracking agent. It should cost about $1 a cow a season. Cream may still have to be used as well if teat sores develop.

Please turn to page 25

Premium grade milk means increased earnings

Diversey means premium grade milk

Milkstone and the thermoduric bacteria it creates are the greatest threat to high earning premium grade milk. How do you combat the problem? With the Diversey dairy farm hygiene programme.

Diversey inspect your plant, run tests, then advise how to get the best results at the lowest price. What's more, all advice, assistance and tests are free. You get a free water hardness test. Free advice on grading problems. Free assistance in removing milkstone. And free advice on milkstone prevention.

Four way benefits are built-in to every dairy hygiene programme – to upgrade milk quality – and profits!

1. Each step follows on naturally, ensuring no milkstone build-up and low thermoduric counts – through every stage.
2. Programmes are custom made to suit individual requirements and farm conditions.
3. The programme of rinse, detergent and sanitiser is the surest, safest way to prevent milkstone build-up.
4. The programme also helps to prevent the spread of mastitis and ensures complete cleaning and effective sanitation.

FREE ADVISORY SERVICE.

Post the coupon for the free services and tests already mentioned. You've nothing to lose – everything to gain.

Diversey Wallace Ltd

DIVERSEY WALLACE LTD.
P.O. Box 23-172
Papatoetoe
Ph. Pop 82-119

Please send a Dairy Farm Hygiene expert to inspect my plant and advise on a programme to keep my equipment hygienic and free of milkstone. This places me under no obligation.

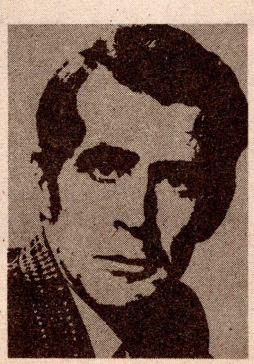
NAME .....

ADDRESS .....

Ph. .....

DW4

The package deal that's guaranteed 100% effective for keeping milking equipment clean in tough areas



Klenz Stainless Steel detergent prevents the build up of milkstone or mineral deposits which harbour deadly armies of bacteria, especially thermodurics. For use only in stainless steel plants, Klenzade guarantee 100% product effectiveness with simulator tested **Klenz Stainless Steel** detergent. So if you are having problems with your detergent wash, contact a Klenzade representative who will advise you on the most effective and economical method of maintaining a clean plant. Contact him through your Dairy Company.

KLENZADE

EL KLENZADE DIVISION OF ECONOMICS LABORATORY NEW ZEALAND LTD

P.O. Box 10-061 Hamilton. Telephone 494-829.

Hildred Carlisle gives detailed case histories of proven product effectiveness on the N.Z.B.C. "Country Roundabout" 5-6a.m. daily.

MASTITIS

from page 22

• **Treating clinical cases when they occur:**

The appearance of clots in the milk or other signs of mastitis means that prompt treatment should follow. A vet should be contacted initially to provide information on the correct treatment of mastitis during lactation. The full course of treatment prescribed MUST be carried out at the intervals recommended.

• **Dry cow therapy:**

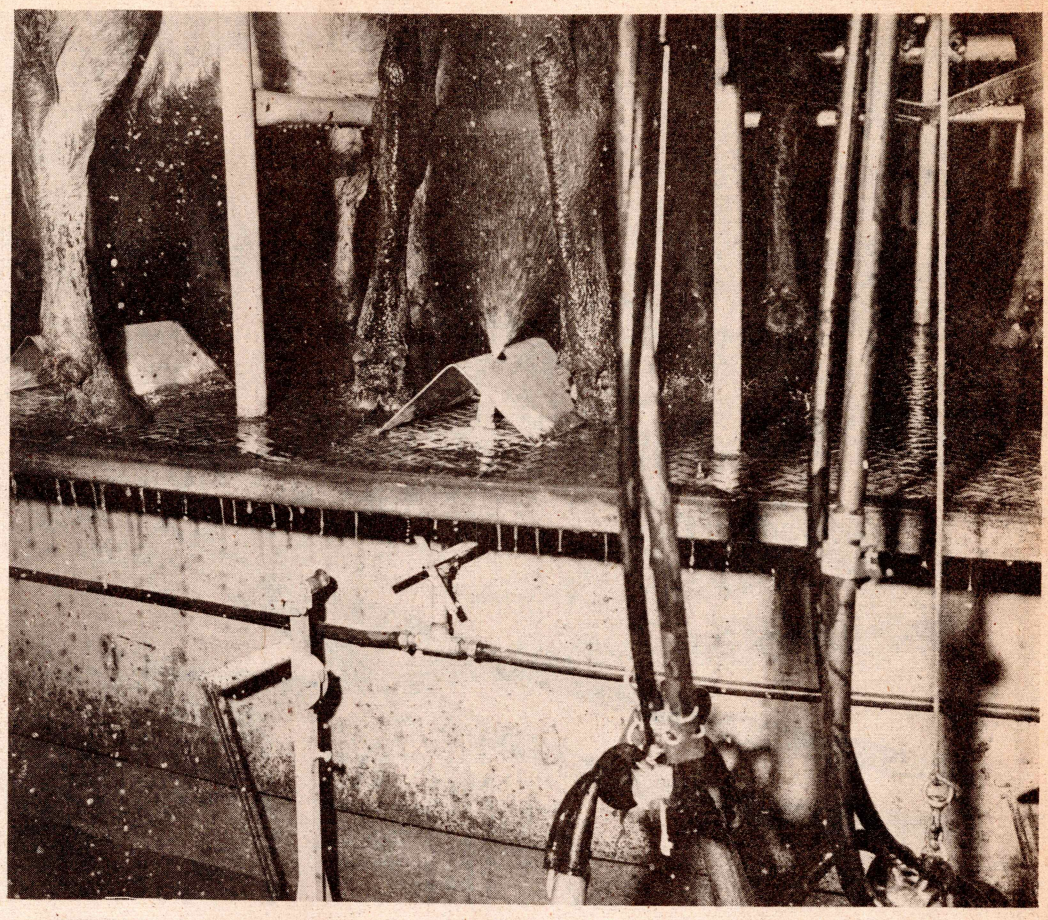
Each quarter of every cow should be treated with a tube of specially formulated antibiotic immediately after the last milking before the dry period. A veterinarian must be consulted since a wide range of antibiotic products is available.

• **Culling unresponsive cows:**

A cow that has recurring cases of clinical mastitis in one lactation is a menace to the rest of the herd and should be culled. Detailed records should be kept so that such cows can be culled irrespective of production.

If strict attention to hygiene accompanies this "Five Point" plan, it should be possible to keep mastitis incidence within tolerable limits.

Please turn to page 27



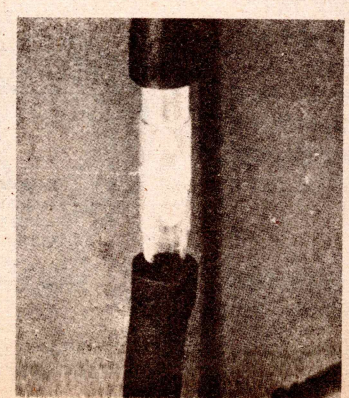
Automatic teat spraying may aid the battle against mastitis in the shed. Picture taken in Mr Dennis Lepper's rotary milker at New Plymouth.

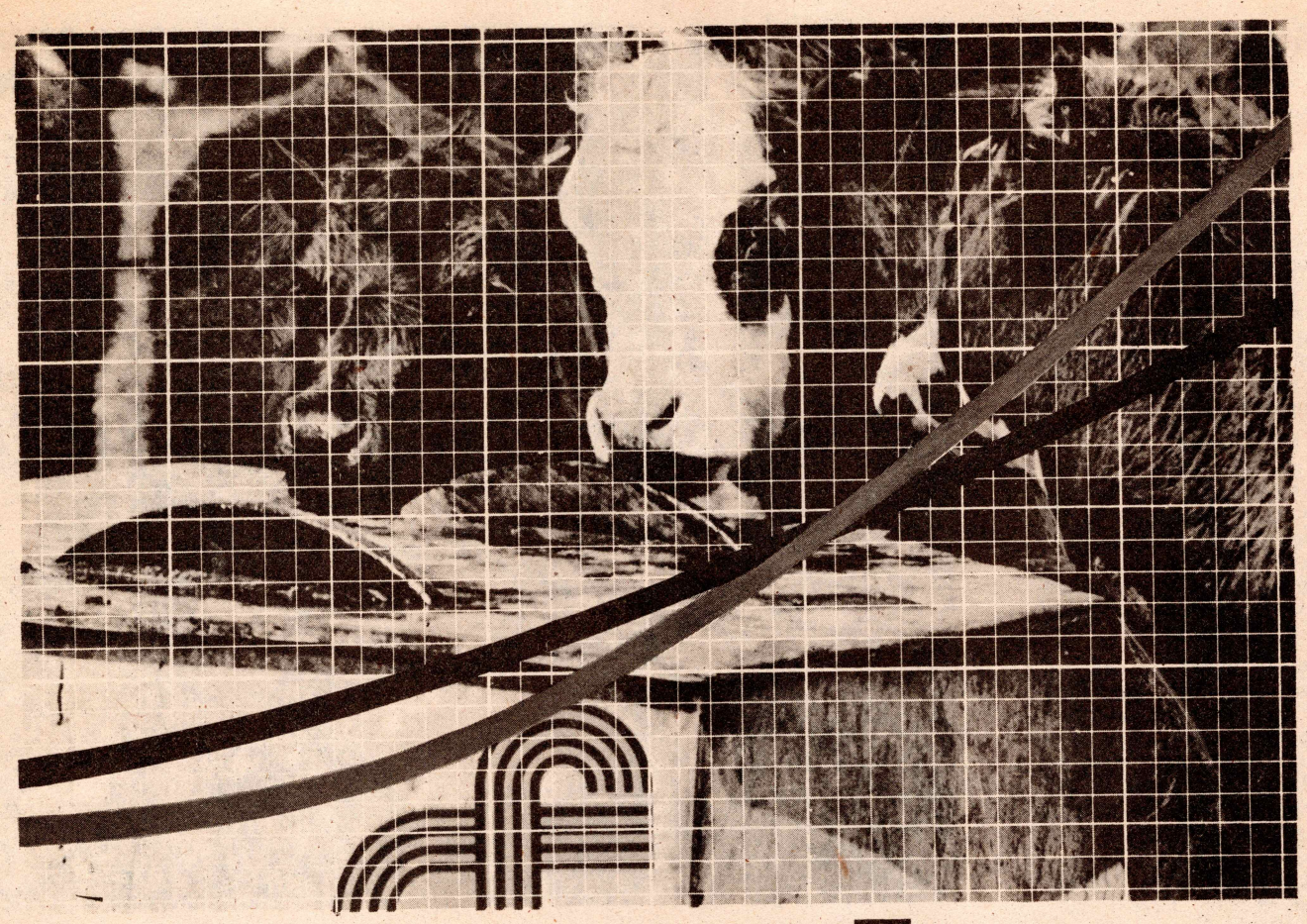
The NIRD mastitis detector

The NIRD Mastitis Detector is claimed to be a useful aid for detecting mastitis. It comprises a small plain tube which is placed in the dropper at a convenient height. Inside the tube is a filter on which clots from a mastitic cow collect. The tube is best looked at just as the cluster is removed from each cow, since air from the cups clears the foam and enables the clots to be seen.

After milking, the filter is removed and the debris cleared by back flushing, using a special jet provided. The distributors say that this jet should be permanently installed on a rubber hose.

If the filter blocks during milking, the cluster will fall from the udder. If this happens, the filter should be removed and replaced with a spare or, in severe cases, with the plain tube provided. Each mastitis detector pack consists of six filters, one jetting tube and one plain tube.





MEAT PRODUCTION
MILK PRODUCTION

Now. Improved performance, increased returns with agri-feed Liquid Supplement

Better nutrition is the main factor contributing to higher conception rates, calving percentages, birth weights, rates of milk production and weight gain. Agri-Feed Liquid Supplement has been specially developed to provide an additional source of protein when fed in conjunction with roughages or grain to ruminant animals.

Agri-Feed Liquid Supplement (a formulation of molasses, phosphoric acid, urea, trace minerals and vitamins) contains 30% of protein equivalent thereby contributing towards improved performance and increased returns.

Get the facts on Agri-Feed Liquid Supplement now. Contact any Stock or Station Agent or Dairy Company.

Agri-Feeds Limited
Tasman Quay, Mt. Maunganui.

Licensed under the Animal Remedies Act 1967 No. 2533

agri-feed
Liquid Supplement

Master distributor:
Dalgety New Zealand Limited

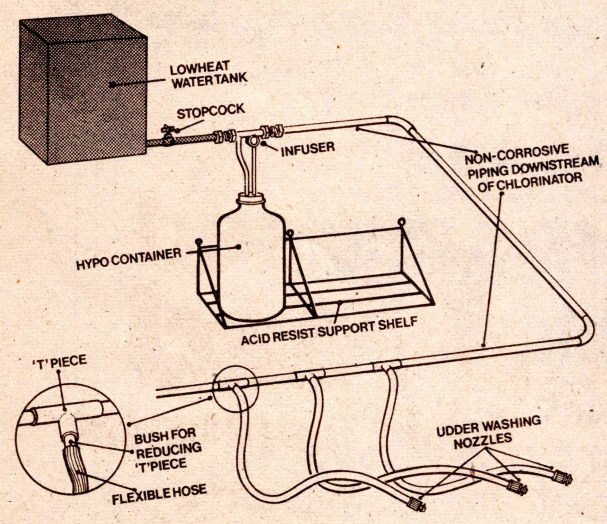
Simple chlorinator for mastitis

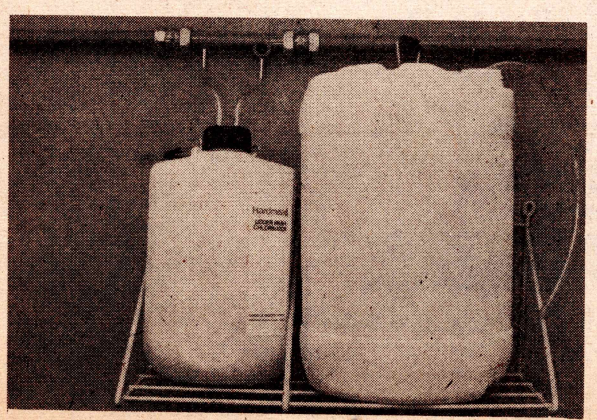
The mastitis control system developed and advocated by NIRD in the UK is now commercially available as the Hardmead Udder Wash Chlorinator, reports the British "Farmers Weekly. It accurately meters an effective quantity of commercial sodium hypochlorite solution into a low-heat udder wash system, and can be easily installed into new or existing parlours.

On material costs alone, it is claimed by the makers to save up to £50 per year for a 50-cow herd, when compared with the cost of treating the same herd with a competitive mastitis-control chemical.

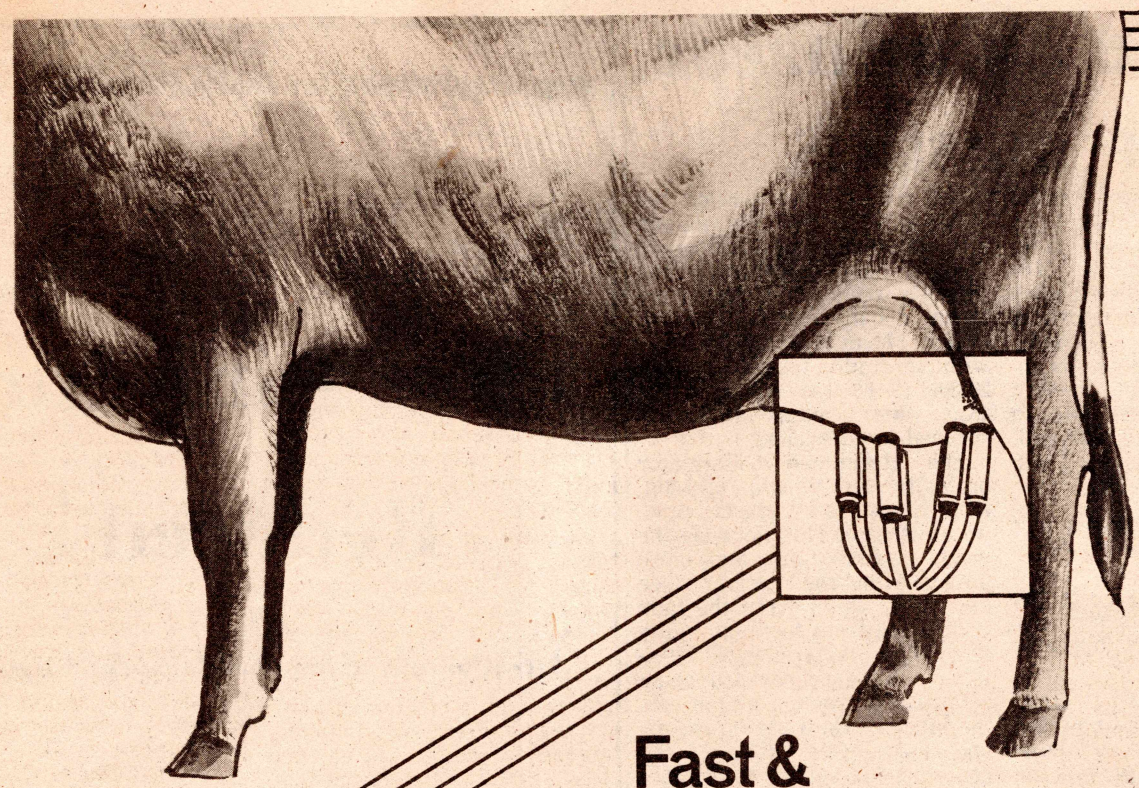
The chlorinator was developed by NIRD — who now use it on their own herds — following research which proved the application of chlorinated water by spray nozzle held in one rubber-gloved hand, while the other gloved hand washed the teats, to be the most simple and effective method of udder washing and mastitis control. This, tests showed, would reduce the mean colony count of Staph aureus on an unwashed teat — with foremilk taken — from 23,000 to 69 (as compared to 1630 where mains water is sprayed for 15 seconds).

The Hardmead Chlorinator basically comprises a rigid 6in. long x ¾in. bore plastic pipe, which is connected between the warm water tank and hose pipelines in the parlour (see diagram). Water from the tank is diverted from this pipe into a two-gallon hypochlorite container, the hypo solution being returned by venturi action into the pipeline via a sealed metering device. One filling of the containers is sufficient for 2500 udder washes, and up to 10 washing nozzles may be used efficiently at the same time.





The Hardmead Udder Wash Chlorinator.



Fast & efficient milking demands reliable rubberware

Feltex **Reidrubber**

MILKERWARE is reliable

Milkerware inflations and tubings trusted by farmers throughout the world. Your Stock and Station Agent carries the full range of hygienic and reliable Reidrubber Milkerware products.

Reidrubber

MILKERWARE

Made in New Zealand and sold throughout the world by Feltex Rubber.

8924

TEAT-SPRAYING GEAR

A variety of equipment is used by farmers to spray teats as a mastitis control measure.

The most simple devices used are small self-contained hand sprayers of which there are many different types. There are "pump up" sprayers, usually of metal, and there are plastic sprayers like the ones shown in the picture on page 22.

Many find small sprayers like these to be completely satisfactory and will continue to use them. But they have two main disadvantages: Since they are often left on the shed floor between periods of use, they can be annoying to the farmer who likes to keep his milking area as uncluttered as possible. (Incidentally, wide-based sprayers, like one of the types pictured on page 22, would seem to be preferable since these are more likely to remain upright.)

Their other disadvantage is to do with their spraying efficiency. Best coverage of all teat surfaces is obtained if the spray is directed upwards from underneath the teats rather than from one side. But with these hand sprayers, the operator has to be a bit of a contortionist to direct the spray in this way.

A better coverage can be obtained by using a garden-type sprayer with a long spray boom. One portable model — shown on page 22 — has a plastic spray-liquid container in which pressure is built up with a few strokes of a pump fitted to the top. This builds up enough pressure for a row of cows to be sprayed.

A variation of this approach is to stand a pressure tank in a corner of the pit and have a length of plastic hose, long enough to reach the other end of the pit, with a hand-grip spray nozzle.

Once pressure has been built up in the tank, a few strokes at the end of each row of cows is sufficient to maintain pressure for all udders to be sprayed. The spray attachment is fitted to the handpiece in such a way that when it is held in the normal position the spray is directed vertically upwards.

An enterprising Waikato dairy farmer, Mr A. F. van Hellemond, of Tauhei, has devised and built his own teat spraying system which is pressurized by a motor-driven water pump. This surprisingly simple yet highly effective system is shown on page 21. A mixture of emulsified paraffin and disinfectant, held in a 12-gallon drum in the milk room, is pumped into a pressure chamber by a small water pump powered by ⅓ hp electric motor which came from an old washing machine.

Pressure in the chamber is kept at between 20 and 40 psi using an automatic cut-off switch. A one-way valve prevents back flow through the pump. Liquid under pressure proceeds from the pressure tank through a vertical strainer to a length of ½in plastic tubing running the length of the shed above the pit. Four droppers of the same dimensions fall at intervals from T-junctions fitted into this line. Sprayheads fitted with wide-angle nozzles are carried on the ends of the droppers.

Three cows of the 12 on each side of this herringbone can be sprayed with each nozzle. Mr van Hellemond says that teat spraying with this gear takes very little extra time: He and his helper simply remove three sets of cups at a time so that they can spray three udders using the one dropper.

He was equally enthusiastic about the effects of the spraying. There had been no cases of clinical mastitis in the herd up until mid-November after three months spraying, and teats were "beautifully soft with very little cracking."

Mr van Hellemond says that his spraying arrangement cost him about $55. Other farmers using new materials and outside labour would probably find it more expensive to similarly equip a shed however. Mr van Hellemond says that it's important that all junctions and unions in the system are made leakproof otherwise a slippery pit floor can result.

Mr Knud Moller, MAF veterinarian at Hamilton, who has Mr van Hellemond in one of his mastitis control discussion groups, says that he is impressed by the efficiency and economy of this system. He thinks that it could be a useful method for general use. Some farmers, he says, have become discouraged when portable sprayers have broken down with the result that they have stopped teat spraying altogether. He says that Mr van Hellemond's system seems reliable and within the financial reach of farmers.

MILK

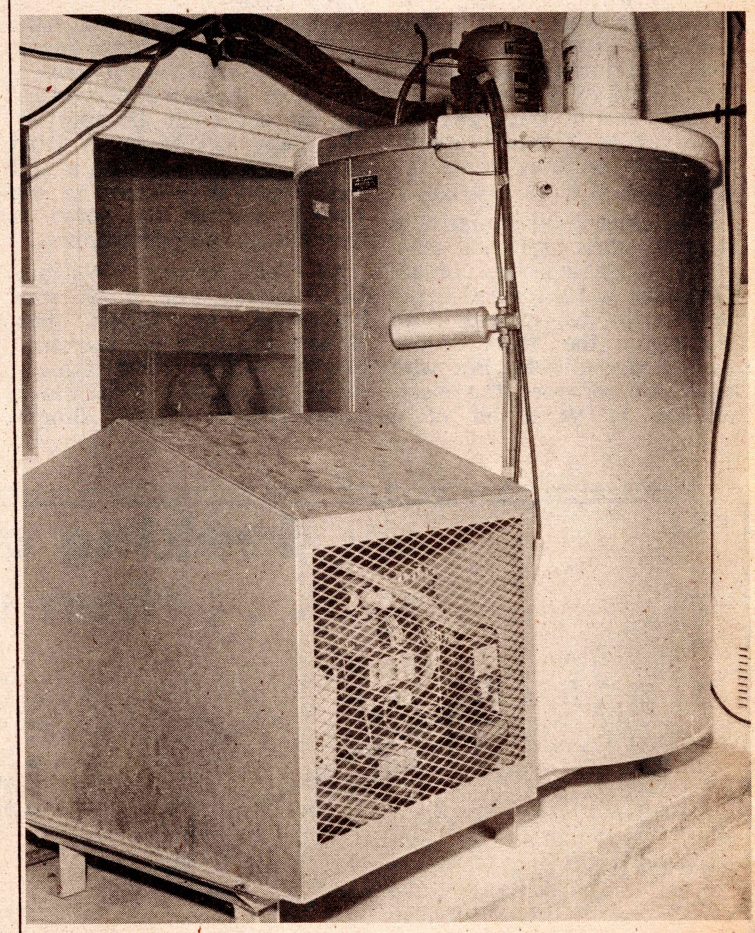
Cooling is the second vital "C" (the first was "cleanliness") in the production of quality milk from the cowshed. All efforts made to set the highest standards of hygiene in the shed will come to nothing if the milk is left sitting in an uncooled vat for a few hours.

Bacteria normally present, and collected as the milk passes through the milking plant, will multiply rapidly in an uncooled farm vat.

Refrigeration does not kill bacteria — it merely reduces their rate of multiplication.

Two main factors have made refrigeration of milk on the farm more necessary in recent years. First, companies are seeking to curb rapidly rising transport costs by requiring milk to be held longer at the farm. And secondly higher-quality raw milk is required by factories to produce higher-quality products.

Several New Zealand dairy companies have in recent years set about introducing refrigeration on all their suppliers' farms. Some companies have



An icebank cooler. Ice is made and stored in the large tank, the refrigeration unit working during off-peak power supply hours. The ice then serves to lower the temperature of water in the milk cooler during milking. This system is useful where power reticulation is inadequate for continuous-running vat refrigerators, but still doesn't overcome temperature problems when milk is held for long periods in uninsulated vats.

REFRIGERATION

opted for icebank coolers which act by lowering the temperature of water passing through the cooler. But a great number of other companies have installed refrigerated vats of various designs.

Generally, icebank units tend to be more expensive, require more space and, probably most important, they leave the gate open for bacteria to start multiplying again once the chilled milk starts to warm up in the vat.

Refrigerated vats solve this latter problem but their value, too, can be reduced considerably by poorly-planned installation. There have been plenty of examples of such poorly-planned installation around the country, too.

To date, the Dairy Division has made little information available on refrigeration unit design and installation, despite the fact that such information has been urgently required.

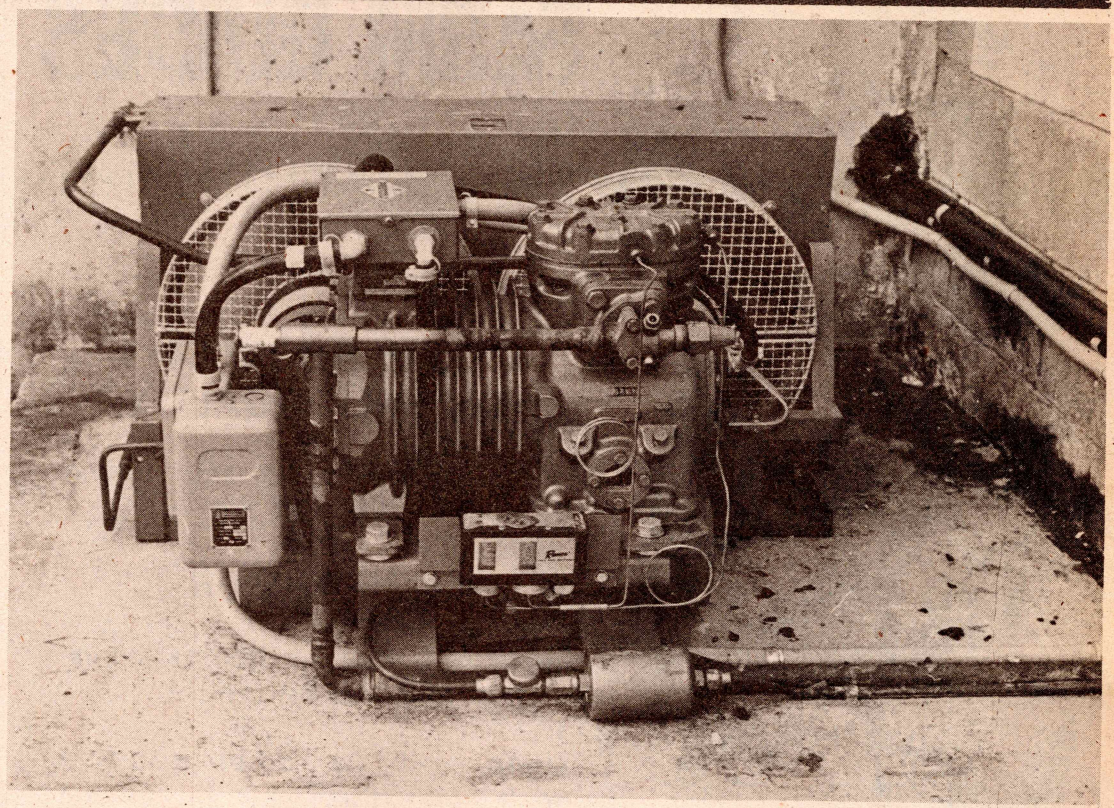
Those companies still to move on this vital question of refrigeration will be awaiting with interest the publication of the results of tests run over the last two seasons by the Waikato Dairy Laboratory. These tests aim at finding out which units are the most efficient coolers of milk on the farm.

Some companies have meanwhile run their own tests to decide which unit is best for their conditions. One of these companies, the Rangitaiki Plains Dairy Company, has published their findings in their "Project Premium" booklet.

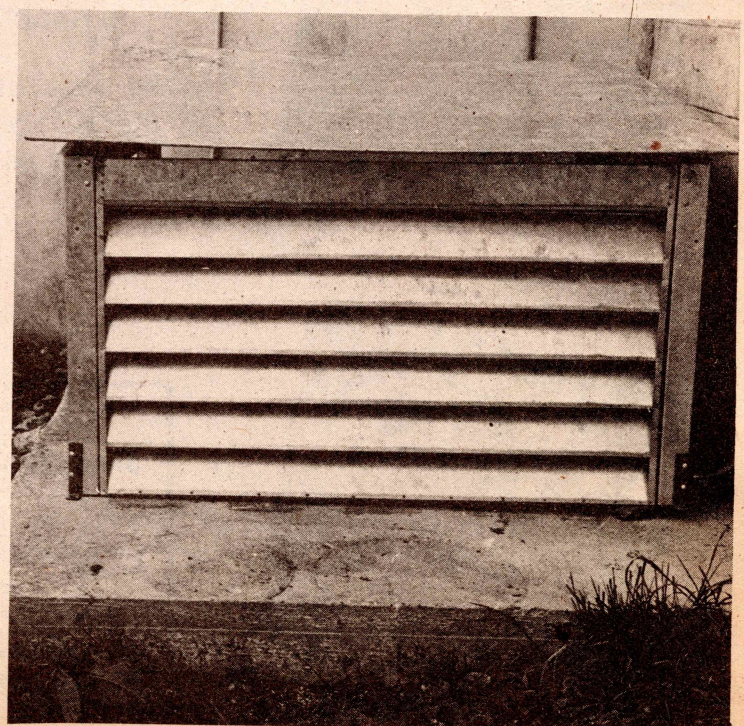
Refrigerated vats

When faced with the choice between icebanks and refrigerated vats, the company opted for the latter, since they permit delayed and sometimes skip-a-day collection, hence cutting transport costs considerably.

A series of tests on different types of refrigerated vats showed that most efficient both in terms of cost and in operation was the type where refrigerant was contained within a double skin on the vat's bottom.



A typical refrigeration condenser/compressor unit specified by the Rangitaiki Plains Dairy Company to chill milk held on a supplier's farm in a refrigerated vat. The unit is shown here uncovered and covered. These units are placed outside the vat room so that they'll operate at maximum efficiency.



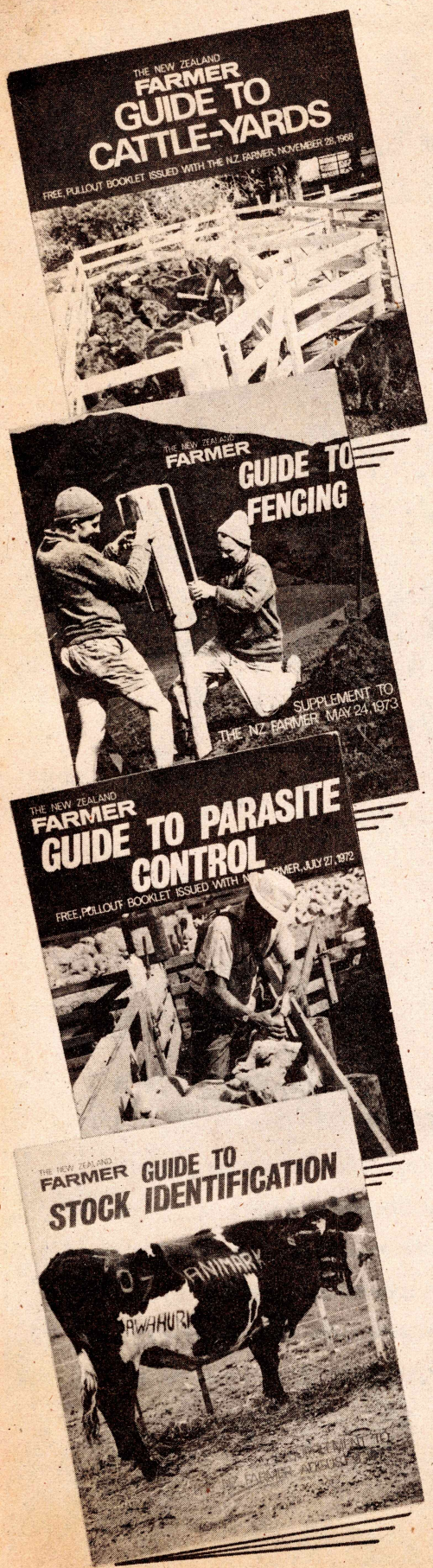
Rangitaiki vats now installed have single-skin side walls and insulated bottoms and have a large diameter-to-height ratio.

Each of the Rangitaiki company's 540 suppliers has only one vat. They vary in size from 500 to 2000 gallons. Those of 1000 gallons and larger have a sealed dome top with a small manhole in the side.

Each vat's compressor and condenser unit is placed outside the milk room to give it ample ventilation; 500 gallon vats use 1hp units while those of 1000 gallons and over use 3hp units.

Alan Twomey at the Waikato Dairy Laboratory has given a

Please turn to page 32



FREE FARM GUIDES

THIS BOOKLET ON MILK QUALITY

is just one of many which readers of the

NZ FARMER

get as a bonus on their subscription of $4.55 for 24 copies.

There will be other subjects dealt with this year in special booklets in the same practical, authoritative manner.

Make sure of your regular copy of the NZ FARMER by filling in the coupon below.

Circulation Dept, NZ Farmer,
P.O. Box 3176, Auckland, 1.

Send NZ Farmer for 1 year to:

NAME .....

FULL POSTAL ADDRESS .....

.....

PLEASE PRINT IN BLOCK CAPITALS

ENCLOSED IS CHEQUE FOR $4.55

REFRIGERATION

from page 31

rule-of-thumb formula which will assist those specifying compressor unit size for each vat.

The formula calculates the capacity (in BTUs an hour) by multiplying the weight of milk in lbs by the number of degrees it is to be cooled and dividing this figure by the number of hours required to cool the milk. The milk weight figure should be taken at the night milking in the peak of the season.

For example, if 200 gals (2000 lb) of milk is to be chilled from 60 deg F to 45 deg F in four hours, the equation is:

$$\text{Capacity} = \frac{2000 \times 15}{4}$$

= 7500 BTUs an hour

Compresser units used by Rangitaiki suppliers are protected by metal covers vented at one side and made quite a bit higher than the units they cover to aid ventilation further. Great care should be taken to ensure that refrigeration units are well ventilated

In-place cleaning was adopted for all the sealed-dome vats at Rangitaiki. Such equipment is in common use throughout the country now.

And refrigeration was not as costly as many feared. One Rangitaiki supplier whose herd peaked at 6300 lb milk daily in 1967/68 found that on-farm refrigeration cost him, in running costs, only an extra $87 over and above the $240 power charge incurred for running the shed normally. (The company owns the vats: Suppliers pay a rental for their use.)

An important back-up service organized by the company consisted of two comprehensive shed sheets. One gave operating instructions for the refrigeration system itself while the second covered cleaning techniques. The first sheet tells the supplier, among other things, how to raise and lower the thermostat.

The secret of the successful use of on-farm refrigeration units on Rangitaiki suppliers' farms can be put down to three things:

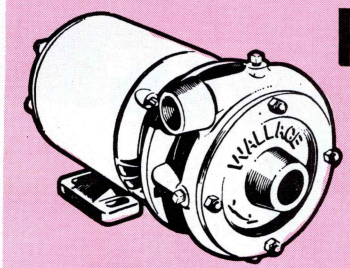
- An extensive testing programme before any installation.
- An educational programme which kept nothing from suppliers.
- An efficient backing-up technical service.

Wallace

THE BEST IN FARM EQUIPMENT

Wallace

MOTOR MOUNTED SHED WASHING PUMPS

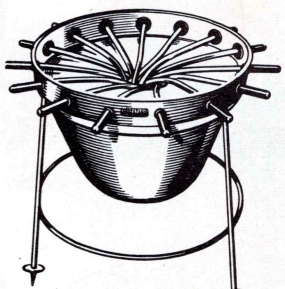


Install the Wallace shed washing unit now! . . . and save up to 30 minutes clean-up time after each milking.
An electric motor-mounted centrifugal pump with impellor connected directly to a special motor shaft ensuring perfect balance and alignment in operation — gives improved performance — longer life.
A choice of several motors.

Wallace

FEED ALL YOUR CALVES AT 'CALFETERIA'

Registered Trade Mark

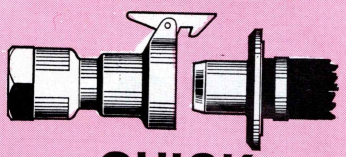


CALFETERIA '15'

Patented self-sealing teat holds milk where calves want it, without foot valves. Today calf feeding takes a matter of minutes even on the largest dairy farms. With 'Calfeteria' every calf gets its fair share, in the nearest to natural form of feeding yet developed. And the majority of calves learn to feed the very first day. Save hours on feeding with Calfeteria — used and acclaimed all over New Zealand.

Wallace

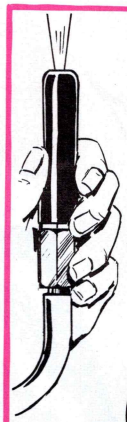
S.H. INSTANT ACTION



QUICK COUPLER

Use the **Quick Coupler** with the Shed Washing Unit above.
PUSH ON — valve opens!
PULL OUT — valve closes!
This is the ideal hose coupler for all flushing installations — outdates all other methods.

Wallace



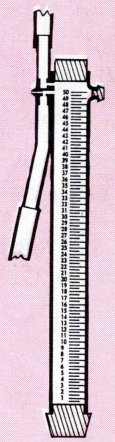
SPOT ON HOSE TAP

'On and Off' water control at your finger tips! Full water flow control within your hands! Cuts on or off with the slightest pressure of your thumb. Strong brass valve within the flexible rubber control cover. From Hardware Stores and Stock Agents.

$2.30

Wallace

BODMIN MILK METER



Bodmin tested herds increase butter fat production thus giving higher returns. An essential part of good dairy farming. Easily fitted to all plants. Made of strong easily cleaned materials.

WALLACE

D.McL.Wallace Ltd.

Phone 666-013, P.O. Box 12174, Penrose, Auckland
also at Whangarei, Hamilton and Wellington

Please send me further information without obligation to purchase, on —

- ☐ **Motor Mounted Shed Washing Pumps**
- ☐ **S.H. Instant Action Quick Coupler**
- ☐ **'Calfeteria'**
- ☐ **Spot On Hose Tap**
- ☐ **Bodmin Milk Meter**

Name .....

Address .....

.....

F 274

Allflex

Superfast TAG SYSTEM

The 'Allflex' system is the ★**Quickest** ★**Cleanest** ★**Safest** ★**Permanent** way to tag your stock.

- ★ The 'Allflex' system offers a tag both sides of the ear.
- ★ The 'Allflex' Applicator is easy to load and gives instant snap together application.

Approved for Brucellosis testing.

To:
delta plastics ltd P.O. Box 765, Palmerston Nth.
Please send me free tag sample and price list for:
☐ **CATTLE** ☐ **CALVES** ☐ **SHEEP** ☐ **PIGS**

NAME .....

ADDRESS .....

..... PHONE .....

delta plastics ltd

931 Tremaine Ave, Palmerston Nth, NZ Phone 84-136. Telegrams 'DELTA'